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Long-term presidents are important to institutions of higher education, yet, studies on presidential tenure in higher education have reported declining tenures for several decades. The studies reporting these declines primarily used surveys of sitting presidents, computed tenure based on years completed to date, and none, to date, have employed structural equation modeling (SEM). This study used a convergent mixed methods design to create a dataset (n=202) on research university presidents from publicly available data and used SEM to test a structural model of presidential longevity. The findings suggest that publicly available data is a viable data source for studies on presidential longevity and that SEM can be applied to higher education research given a large sample and correctly specified models. The study also found that research university presidents' tenure has remained stable over several decades, demonstrating the importance of using presidents' full tenure, rather than completed tenure of sitting presidents as a measure of presidential longevity.

Keywords: public data, structural equation modeling, tenure, presidential longevity, university presidents

DETERMINANTS OF PRESIDENTIAL LONGEVITY IN HIGHER EDUCATION: ESTIMATING A STRUCTURAL MODEL FROM A DATASET DERIVED FROM PUBLICLY AVAILABLE DATA

by

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DEDICATION

I dedicate this dissertation to my loving and faithful husband, Trevor, and children Joshua, David, and Alexa. You have patiently endured this journey with me. I love you.

APPROVAL PAGE

This dissertation written by Aileen Marea Reid has been approved by the following committee of the Faculty of The Graduate School at the University of North Carolina at Greensboro.

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CHAPTER I

INTRODUCTION

College and university presidents are essential to their institutions because they are primarily responsible for financial management, fundraising, managing a senior level team and governing board relations (Muller, 1994; Gagliardi, Espinosa, Turk & Taylor, 2017). These administrative functions are of critical importance especially for the nation's doctoral-granting institutions. Such institutions, referred to as research universities by the Carnegie Classification of Higher Education™, make up 7% of U.S. institutions of higher education (IHEs), educate 32% of the nation's college students and produce most of our nation's PhDs and Nobel Prize winners (American Academy of Science, 2015; Cole, 2016). They also partner with the federal government to conduct ground-breaking research in science and technology that influences American culture and fuels our economy (Cole, 2016; Muller, 1994).

In addition to financial and personnel management responsibilities, current and future presidents will be faced with other important issues such as enrollment management, diversity, and equity issues, and assessment of student learning (Gagliardi et al., 2017; Spellings, 2006). These horizon issues are significant and complex, and institutions tackling them would benefit from long-term presidential leadership. Presidential longevity aids in tackling systemic institutional problems, changing culture, building effective leadership teams, and developing strong relationships with various

campus, community and political stakeholders (Birnbaum, 1989; Korschgen, Fuller & Gardner, 2001). Yet, the length of presidential terms is reported to be on the decline in IHEs (Gagliardi et al., 2017; Monks, 2012; Padilla & Ghosh, 2000) and we have a limited understanding of the reasons for this decline.

Studies tracking presidential tenure have shown steady declines for decades (Cohen & March, 1974; Gagliardi, Espinosa, Turk & Taylor, 2017; Kerr, 1970; McNaughtan, 2016; Monks, 2012; Padilla & Ghosh, 2000; Reed, 2002; Röbken, 2007). Average presidential tenure is 6.5 years (Gagliardi et al., 2017), but some scholars define a long presidential term as ten years or more (Cohen & March, 1974; Kerr, 1970; Korschgen et al., 2001; Reed, 2002). Frequent presidential turnover in higher education can be costly financially in terms of lengthy and expensive searches which may leave the office vacant for as long as two years (Birnbaum, 1988; Howells, 2011). Recurrent turnover can also be costly organizationally, in terms of the disruptions caused by the president's departure and turnover among other senior administrative leaders (Klein & Salk, 2013; Martin & Samuels, 2004; Monks, 2012; Tekniepe, 2014), and politically costly, both internally and externally (Birnbaum, 1988).

The decline in presidential tenure also signals a potential leadership crisis in higher education (Eckel, Cook & King, 2009; Fain, 2010). The average age of presidents today is 61.7 years (Gagliardi et al., 2017), compared to 52 years old in 1986 (American Council on Education, 2007). In fact, 47% of sitting presidents are between the age of 61 to 70, 75% are in their first presidency, and 37% percent of current presidents anticipate stepping down from the presidency within 3 to 5 years (Gagliardi et al., 2017). This data

is cause for concern because it suggests that first-time presidents are taking the job at a much older age than previous generations, but more importantly, that there will be a lot of vacancies in the coming years as baby boomers retire (Skinner, 2010).

Moreover, the prospect of filling these vacancies shows some signs for concern. First, senior academic leadership expresses no desire to move up in the ranks (Eckel, Cook and King, 2009). Secondly, filling vacancies from a young talent pool, the millennial generation, is even more concerning. Millennials' leadership styles, mindset and work preferences (Arsenault, 2003; Sessa, Kabacoff, Deal & Brown, 2007) begs the question of whether they view the academic presidency as a desirable position or one that reflects their experiences (Greer & Virick, 2008). For example, Carman, Leland, and Wilson (2010) reported that a majority of young professionals were uninterested in leading nonprofit institutions because the role is perceived as heavily focused on fundraising and networking, making it easy to lose focus on organizational goals. Similarly, the university president is the chief fundraiser for the institution, must balance the interests of various internal and external constituents, and can become easily distracted from long-term strategic goals if most of his or her time is spent on the aforementioned. From this vantage point, the college presidency may not be desirable to millennials.

If these current tenure trends continue, adding to them federal education funding reforms (American Academy of Arts & Sciences, 2015) and calls for greater accountability (Rabovsky, 2012; Spellings, 2006), IHEs, mainly traditional campuses and research universities, may find it challenging to meet the heightened demands of students

and families, especially when there is frequent turnover among their chief executive officers.

Statement of the Problem

Current trends in the landscape of American higher education highlights the need for long-term chief executives. The average age of current presidents is 61.7 years (Gagliardi et al., 2017), presidents are entering the presidency later in their careers, and neither senior administrative leaders who would be quite capable of picking up the mantle nor millennials desire the title of chief executive (Carman et al., 2010; Eckel, Cook and King, 2009) when baby boomers retire. While long-term presidents are important for the organizational and financial stability of their institutions, presidential terms in higher education have been declining for decades and research on presidential longevity (Langbert, 2012; McDonald, 2012; McNaughtan, 2016; Padilla & Ghosh, 2000; Tekniepe, 2014) has not been able to pinpoint the reasons for these trends.

Presidential longevity in higher education is not well understood. Prior research has primarily focused on personal characteristics (Birnbaum, 1971; Langbert, 2012; McDonald, 2012) and/or institutional characteristics (Birnbaum, 1989; Howells, 2011; Röbken 2007; Wofford, 2014), and only a few have used advanced statistical techniques (Langbert, 2012; Padilla & Ghosh, 2000) or attempted integrated frameworks (McNaughtan, 2016; Tekniepe, 2014) to understand why presidential terms are declining. Moreover, prior studies on presidential longevity have relied on surveys and qualitative interviews with sitting presidents, which have limited their methodological scope.

Purpose and Significance of the Study

This convergent mixed-method study (Creswell, 2015) aimed to update and fill a methodological gap in the literature on presidential longevity. The study created a dataset derived from publicly available data on past presidents of Research 1 and Research 2 institutions in the U.S. to test a structural model on presidential longevity. The study explicates the viability of publicly available data as well as the limited application of structural equation modeling (SEM) to studies on presidential longevity. This study is significant in that it advances quantitative methodological approaches, provides direction for future research using datasets derived from publicly available data and expands the literature on presidential longevity. It is hoped that this study's findings will also provide insight for IHEs who desire to attract and retain high-quality long-term presidents.

Research Questions

Four research questions guided this study on presidential longevity in higher education:

RQ1: What are the challenges and/or opportunities associated with obtaining a dataset derived from publicly available data to conduct advanced statistical analyses?

RQ2: To what extent can a dataset derived from publicly available data be used to test a structural model of presidential longevity in U.S. R1 and R2 universities?

RQ3: Given a dataset derived from publicly available data, what structural model best supports the theory of presidential longevity in U.S. R1 and R2 universities?

RQ4: To what extent do the factors that influence presidential longevity differ among presidents of public and private R1 and R2 universities?

Key Terms

The following section provides working definitions for key terms used in this study.

College or University President

For this study, the terms college president or university president are used to generically refer to individuals who are appointed on a permanent basis to lead a single institution of higher education. The study recognizes that some institutions may use other terms such as chancellor to refer to the IHE's chief executive officer. In this case, the term president is also used as a generic term to describe chancellors who lead a single institution of higher education. Presidents or chancellors who lead university systems (i.e., are responsible for several campuses) are not included in this study.

Long-Term President

Some scholars describe a long-term president as one who has served the same institution for ten years or more (Cohen & March, 1974; Kerr, 1970; Korschgen et al., 2001). Reed (2002), in a study of public university presidents appointed over a four-year period, classified short-term presidents as those serving less than six years. Reed also reported that more than half of the sample of 151 presidents served more than ten years.

Therefore, for this study, a long-term president is described as one who served in the office of president of a single institution for ten years or more.

Presidential Longevity

Historically, university presidents only served in one presidency throughout their career. In the past two decades, however, there is a growing trend, particularly among public university presidents to assume multiple presidencies throughout their career (Monks, 2012). Longevity, therefore, refers to the span of time spent in the role of president of an IHE. Longevity also describes an individual's stamina in presidential positions, whether at a single institution or multiple institutions.

Presidential Tenure

In this study, the term tenure refers to the length of time in a position, rather than the practice of obtaining tenure (e.g., securing a permanent position, as in academia). Cohen and March (1974) proposed five ways to compute *average tenure*:

1. *The backward cohort*. The cohort of presidents who complete their terms in a particular year. For example, among presidents who leave office in 2000, the total number of years spent in office would be calculated and averaged.
2. *The forward cohort*. The cohort of presidents who took office in a particular year. The total number of years spent in office among presidents who began serving in a particular year (e.g., in the year 2000), would be calculated and averaged. Depending on the year of interest, total tenure would be known if significant time has elapsed (e.g., 20 years); in other years, the presidential term could be estimated.

3. *Additional tenure*. The additional years of service for presidents who are currently in office. This information would be known at a future date (e.g., when the president leaves office), but could be estimated today.
4. *Completed tenure*. The number of years completed by presidents as of a particular date. For example, if data were collected on current presidents who are still serving, their length of service would be computed based on their start date to the date of data collection. This information would be known on that particular date but would be considered incomplete because presidents' departure date is unknown and would not be known until a later date.
5. *Full tenure*. The total number of years (completed tenure plus additional tenure) by presidents in office on a particular date (or year). For example, the average tenure for presidents who were in office on July 1, 2000, is computed based on the start and end dates of all presidents who were in office on July 1, 2000.

The literature presented in this study primarily utilized two of Cohen & March's (1974) five definitions: *completed tenure* and *full tenure*. Researchers' definitions depended on the nature of the data used in their studies. For example, Monks (2012) and McNaughtan (2016), who used the American Council on Education's (ACE) *College President Survey* data, measured average tenure as the number of years in office at the time of the survey, because the *College President Survey* samples sitting presidents. Sitting presidents were also surveyed in research involving self-designed instruments (Howells, 2011; McDonald, 2012; Reed, 2002; Tekniepe, 2014).

On the other hand, Padilla and Ghosh (2000) used the president's *full tenure* (total years served from start-to-end of a presidential term) to understand presidential longevity in Research I universities. Röbken (2007) compared presidential tenure using all five methods proposed by Cohen and March (1974) and found that average presidential tenure was highest when the *full tenure* measure was employed. This study, therefore, defines presidential tenure using *full tenure* as defined by Cohen and March (1974).

Research University

Research universities are those classified by the Carnegie Classification of Institutions of Higher Education™ based on a research activity index, as having granted at least 20 research/doctoral degrees, excluding professional practice degrees such as MD, JD, etc., in the classification year (Indiana University Center of Postsecondary Research, n.d). In Carnegie's 2013-14 basic classification (the most recent), 335 doctoral-granting universities were classified into three tiers: R1: Highest research activity (n=115); R2: Higher research activity (n=107) and R3: Moderate research activity (n=113). These classifications are different than the classification used by Padilla and Ghosh (2000) for research universities, which had two tiers: Research I and Research II, as well as two-tiers for doctoral-granting institutions: Doctoral I and Doctoral II. Also, Padilla and Ghosh reported a population of more than 200 Research I institutions but did not provide summary tables or a detailed description of their sampling design. Thus, when 1994 frequencies for these categories were reviewed, it was unclear which categories Padilla and Ghosh used to derive their sample. Moreover, since 1994, the Carnegie Classification of Institutions of Higher Education™ was updated in 2000, 2005, 2010 and 2015.

Therefore, this study used the most recent basic classification of research universities in the United States to define the population of interest.

Organization of the Study

Chapters organize this study. Chapter I introduced the study, the purpose, and significance of this research, and defined the key terms. Chapter II provides a historical analysis of the methods employed to date in understanding longevity, tenure, and persistence among presidents, faculty, and students in higher education. The chapter concludes with an explication of the theoretical and conceptual frameworks and rationale for the study. Chapter III overviews the methodological approach to this study, describing in detail the research design, population and sample, data collection procedures, and data analyses. Chapter IV presents the findings of this study, organized by research questions. Chapter V begins with a discussion of the study's key findings in relation to the literature and deliberates the implications of this research. Next, the limitations of the study are discussed, followed by recommendations for future research. The chapter closes with conclusions drawn from this research.

CHAPTER II

REVIEW OF THE LITERATURE

Research on executive succession is well documented in the literature (Ferris, Jayaraman, & Lim, 2015; Karaevli, 2007; Kesner & Sebora, 1994), but it is primarily focused on the effect of the succession event on the organization's performance. In higher education, the empirical literature on presidential turnover and transition has been both sparse and sporadic, yet, there appears to be renewed interest in the topic, particularly regarding increasing turnover among public university presidents (Monks, 2012) and succession planning (Klein & Salk, 2013). In general, most studies presented in this review investigated presidents in higher education, primarily using surveys and quantitative data analytic methods. However, research focusing on faculty, staff and students' intent to leave or persist in their institutions have also been included in this literature review because their methodological approaches lend support to the design of this study.

Chapter II begins with a historical synthesis of the methods used by scholars to examine turnover, tenure, longevity, and persistence in higher education. The research is grouped and presented by the method and/or statistical procedure. Appendix A provides a summary of the literature examined in this chapter. The table includes the research questions or hypotheses guiding each study, the data source(s), sample and analytic

procedures. The chapter concludes with a description and discussion of the theoretical and conceptual frameworks guiding this study and a summary of the literature.

Mixed Methods

Mixed methods designs are appropriate when dealing with complex research problems (Creswell, 2015) such as presidential longevity and tenure. The primary components of mixed methods design include: quantitative and qualitative data collection to answer research questions; rigorous qualitative and quantitative methods; the requisite skills required to execute data collection and analysis for both methods; interpretation and triangulation of the data to support the findings; and, where possible, a theoretical framework to support the design (Creswell, 2015). One of the strengths of mixed methods designs is the ability to mitigate the limitations posed by using a qualitative or quantitative design alone. The researcher, however, must still be careful to consider threats to validity and trustworthiness when using mixed methods designs (Creswell, 2015; Merriam, 2009).

Two mixed methods studies (Jo, 2008; McDonald, 2012) on tenure and turnover in higher education were identified in the literature. McDonald (2012) tested the American Association of Community Colleges' (AACC) six leadership competency domains for community college leaders on California community college presidents. This framework had previously been used by scholars, but not appropriately tested (McDonald, 2012). McDonald chose a mixed-methods design to gain a more holistic understanding of the relationship between leadership competency as defined by the AACC and presidential longevity among community college presidents. The quantitative

design involved the distribution of a 50-item web-survey to 100 community college presidents in California. The survey was designed for rapid data collection; it contained 47 closed-ended Likert type items and three closed-ended items. Survey results were then used to refine the interview protocol. Factor analysis revealed thirteen variables that accounted for 85% of the variance among the items. Correlational analysis was also used to test relationships between longevity and the six AACC competency domains for community college leaders and to triangulate the qualitative findings. Descriptive statistics were integrated with findings from the other quantitative analyses to triangulate the qualitative results (McDonald, 2012).

McDonald's qualitative design involved purposeful sampling (seeking out information-rich key informants) and triangulation (using different data sources to build themes) (Creswell, 2014) to identify and strengthen the quantitative data. Twelve in-depth interviews with six presidents, two vice presidents, two faculty, and two board members were conducted, analyzed and triangulated with the quantitative data. The goal of the qualitative interviews was to gain a deeper understanding of the social and political contexts of community colleges (McDonald, 2012).

McDonald's study aimed to generalize the findings to California community college presidents as well as fill a gap in the literature regarding the AACC framework. The mixed methods design was appropriate for the study; however, one aspect of the quantitative design was potential self-selection bias (Groves et al., 2009). McDonald sent surveys to all 100 California community college presidents who were not interim presidents, achieving a 48% response rate. In other words, only half of the total

population responded, and with such a small sample size, the generalizability of the quantitative findings was limited. McDonald acknowledged that due to the difficulty of accessing this population, and to gain enough power to conduct statistical analysis on the survey responses, this was the best approach. To compensate, McDonald conducted interviews with a president, vice president, faculty member and board member from the same institution to strengthen his findings.

Jo (2008) was the only study that depicted a rigorous methodology to identify critical factors influencing turnover in higher education. Jo conducted thirty in-depth, face-to-face interviews with female, mid-level administrators who were once employed by a large private research university in the Northeastern U.S. Each participant was also asked to complete a questionnaire containing twelve variables that were found to affect turnover, obtained from a pilot study at the same institution. Questionnaire responses were coded and used to corroborate and triangulate the interview responses and findings.

One strength of Jo's design was that the interviews were conducted with past employees of the institution, which allowed the researcher to capture thoughtful responses, thereby gaining greater insight into the factors influencing turnover among mid-level women administrators. Another strength of Jo's study was that survey results were not only analyzed for key themes, but they were also used to validate (cross-check) the interview data. One limitation of Jo's study was that data was obtained from a single institution, thus, providing limited generalizability to other institutions of higher education. Another limitation was potential self-report bias. Self-report bias, prone during face-to-face interviews, could result when respondents desire to answer in ways that the

researcher expects, when their recall of past events may not be trustworthy, or when the respondent desires to be seen in the best light (Groves et al., 2009). Finally, the author stated that establishing causal effects was not possible due to the complex interaction of individual and institutional characteristics.

Quantitative Techniques

Quantitative designs are appropriate when research questions aim to examine relationships between variables or to prudently reduce a set of variables to statistically test a theory (Creswell, 2014). The primary quantitative designs used by scholars were surveys. Surveys allow researchers to use data collected from a sample of the population to make inferences and generalizations about trends, attitudes or opinions about the population of interest (Creswell, 2014). It was also observed in a few studies, where survey data was limited or not accessible, publicly available data from institutions' website, media sources and other higher education information sources were integrated with survey data or served as the sole data source. Finally, the primary statistical techniques utilized with the quantitative designs included analysis of variance (ANOVA), correlational analyses, regression, and longitudinal analyses. The sections following overview the use of these quantitative techniques in studies on presidential turnover and tenure.

Analysis of Variance

Analysis of variance (ANOVA) is appropriate when the primary research goal is to evaluate mean differences between two or more groups (Gravetter & Wallnu, 2011). Birnbaum (1989) used three-factor ANOVA to analyze data from the Educational Testing

Service's (ETS) Institutional Functioning Inventory (IFI) to assess the importance of college and university presidents on institutional performance. The 132-item instrument (capturing eleven different scales) was administered in 1968-1970 and again in 1980-1981 to a sample of full-time faculty to obtain their perceptions of organizational culture. The dependent variable was the mean IFI score. Independent variables included institutional control (public v. private), institutional level (university, comprehensive college, liberal arts college or two-year college), and the number of different presidents (1, 2 or 3) during 1970-1980. The 1970 scale score was a covariate. Birnbaum found that the number of presidents between 1970 and 1980 did not have a significant impact on institutional functioning; presidential changes explained only 1.1% of the variance in 1980 scores.

Birnbaum discussed two noteworthy limitations in his study. First, the study was not a repeated-measures design; the faculty was not necessarily the same in the first and second waves of the survey, as the institutions that responded to the survey in 1980 were only described as similar to the 1970 sample. Second, the instrument had a limited scope and did not capture aspects that are close functions of the president, such as the institution's financial performance or programming. In other words, the instrument was not specifically designed and administered for this study (Birnbaum, 1989).

Reed (2002) used an ex-post facto design to compare the personal, professional, and institutional characteristics of 151 presidents hired between 1987-1990 by four-year public institutions to establish baseline data on presidential turnover and tenure. Data was collected via a mail survey designed by the researcher. Personal characteristics of interest

included gender and race/ethnicity. Professional characteristics included the origin of candidacy (i.e., internal vs. external), career path to the presidency (i.e., academic vs. administrative), and number of presidencies. Institutional characteristics included source of institutional control (public vs. private), enrollment (measured by FTE students), institution type, institutional wealth (total educational and general expenditure per FTE), and president's reporting line. Reed also explored presidents' post-presidency activities (transferred to new presidency, retired/died in office, assumed faculty position, assumed other position). One-way ANOVA was used to evaluate pair-wise relationships between presidential tenure, turnover and short-term presidencies with the variables of interests.

Overall, the study's findings revealed relatively stable tenure among public four-year university presidents and no significant differences in tenure and turnover by race/ethnicity or gender. Also, more than two-thirds of the sample remained in their presidency after six years, and 56.2% of presidents served for 10 or more years (Reed, 2002). Reed's study, however, only focused on public university presidents and did not include other variables such as the president's age or discipline of the highest academic degree; these variables that have been investigated more recently by other scholars (Monks, 2012). Finally, the researcher provided a list of other data analytic techniques employed, which included t-tests, linear regression, and chi-square, but did not describe in detail how they were applied or a rationale for her choice of analytic data procedures.

Röbken (2007), in a study on leadership turnover among university presidents and rectors in Germany between 1960 and 2004, also used analysis of variance and post-hoc tests to analyze the relationship between presidential tenure and organizational size (four

size groupings determined by number of students in 2004). Röbken hypothesized that larger universities are more stable and thus, would experience infrequent leadership turnovers and longer tenures than smaller universities. Using the mean number of years in office at a particular university as the dependent variable, Röbken found that presidents and rectors who led universities in the quartile with the smallest student body had the shortest tenures, compared to presidents leading universities in the two largest quartiles; no significant differences were found between the other three size quartiles. Röbken did not provide details regarding how much of the variance in length of tenure was accounted for by the quartile with the smallest student body.

Correlational Analyses

Correlational analyses are appropriate for non-rigorous research designs with a primary interest in the associations or relationships between two variables. Correlations, however, should not be interpreted as implying a cause and effect relationship between two variables (Gravetter & Wallnau, 2011).

Birnbaum (1971) was one of the first empirical studies to delve into leadership succession in higher education by examining the institutional characteristics of colleges and universities involved in presidential succession. Birnbaum hypothesized that during the presidential search and selection process, institutions seek out individuals "who have been socialized" (Birnbaum, 1971, p. 135) in comparable institutions. Using a 1970 sample of 76 presidents of New York State college and university presidents, he employed bivariate correlational analysis to describe the relationship between a president's socialization (characteristics of president's immediate prior institution) and

his current (receiving) institution's characteristics (institutional size, institutional type, institutional control, and selectivity). Birnbaum found that college and university presidents generally succeed other presidents at institutions with similar selectivity, institutional control, and institutional type; institutional size was not statistically significant (Birnbaum, 1971).

More recent studies (Howells, 2011; Langbert, 2012; Röbken, 2007 and Wofford, 2014) also explored the relationship between institutional characteristics and presidential tenure and longevity. Röbken (2007), discussed earlier, intended to follow-up the ANOVA to test for significant differences between organizational size in German universities and presidential tenure using a time series analysis. However, Röbken resorted to correlational analysis because the data lacked sufficient financial information to test hypothesized relationships between presidential longevity and teaching expenditure and research expenditure.

Wofford (2014) used data obtained from the Integrated Postsecondary Education Data System (IPEDS), counts of presidential succession events obtained from university websites, and the *Top American Research Universities* rankings (TARU; The Center for Measuring University Performance), to check for associations between the number of presidential succession events between 2000-2010 and measures of access, affordability, and accountability. The sample of 147 public institutions included all research universities ranked "Very High" or "High" on the Carnegie Classification of Institutions of Higher Education. Private and doctoral research institutions were excluded from the sample. Wofford had also planned to use time series analysis to explore the relationship

between public research university performance and succession events between 2000-2010, but once data were observed and described, and after internal consistency checks, correlational analysis appeared to be a better fit.

No statistically significant correlations were identified between presidential succession events and access and affordability, and only a small positive correlation (r =.15) was reported between accountability and succession events. Given the exploratory nature of the study, research questions, and the data sources used, a correlational analysis was appropriate. However, one weakness of the data collection strategy was the issue of missing data; all schools do not necessarily receive an annual TARU ranking on each of the nine variables.

Howells (2011) distributed an 18-item survey to 904 community college presidents affiliated with the American Association of Community Colleges (AACC). After two email follow-ups over a six-week period, a total of 224 completed survey responses were analyzed. Howells performed a correlational analysis to understand which method of selection among six types of presidential search processes was most successful in selecting presidents based on the longevity of current presidents. She also checked for correlations between institutional type and longevity. Howells' findings revealed that the only statistically significant relationship was between the tenure of current community college presidents and the use of a search process. Only after observing a statistically significant association between longevity and use of a search process did Howells employ the general linear model (GLM) as the second level of analysis. Howells used continuous tenure rather than completed tenure as the dependent variable.

One weakness of the study was that more than 70% of current and previous presidencies were selected by a national search (3 of the six types of presidential searches). Given this finding, Howells' theory about presidential searches could have been refined, and the design made more rigorous. For example, Howells could have collapsed the three national search categories and the two internal search categories into one category each and tested a theory of internal versus external hire.

A second weakness was that responses were slightly skewed toward presidencies with low tenure; 48% of presidents reported being in their current positions for less than one year (Howells, 2011). To address the potential self-selection bias, given the response rate and high percentage of newer presidents (Groves et al., 2009), Howells could also have broken the respondents into two groups: presidents serving less than one year and presidents serving more than one year. In breaking up the groups, Howells could address the skewness issues by testing for group mean differences. Finally, Howells' study lacked control variables. Not only was the GLM analysis weak in that it used completed tenure, for which nearly half the sample had been in office less than a year, but there were no control variables considered. To add rigor, Howells might have considered controlling for institutional characteristics such as size and board governance (Klein & Salk, 2013) to strengthen her analysis.

In exploring the tenure of private college and university presidents, Langbert (2012), compiled 1999-2000 and 2005-2006 cross-sectional data from *US News and World Report*, the *Chronicle of Higher Education*, university websites, newspaper articles and academic search databases on 200 private college and university presidents.

Like Birnbaum (1971), Langbert also considered the relationship between social matching and presidential tenure, but he went a step further to integrate both personal and institutional characteristics in his framework. While social matching was not operationalized in the study as a construct, Langbert used a progression of statistical methods to determine the degree to which social matching and improving the institution's performance (i.e., turnaround) influence a president's tenure.

Specifically, Langbert used correlational analysis to test for associations between presidential tenure (dependent variable), and independent variables he believed were indicative of social matching. These variables included religious affiliation to the current institution, religious affiliation to his/her baccalaureate institution, internal hire, alumnus of his/her institution, attended a private baccalaureate institution, and academic background. Presidents were coded with having turned the institution around if local press or the IHE gave the president credit for turning the institution around, the president "built the institution from scratch" (p. 4), or the university's SAT scores or endowments improved considerably. Ten percent of the presidents were coded as turnaround presidents (Langbert, 2012).

Langbert reported low overall correlations between social matching and presidential tenure, suggesting a different set of social matching indicators may be more plausible, or a different method of analysis might be required. For example, using the measures described earlier, a structural equation model may have been more appropriate to test Langbert's theory about presidential turnover, using social matching in a causal sequence (e.g., path analysis) to predict turnover. Also, social matching could have been

operationalized as a latent construct and validated with confirmatory factor analysis (e.g., measurement model). Finally, stricter measures such as increases in enrollment or increased expenditure on teaching and research (Röbken, 2007) may have been better measures of the president's performance or evidence of a turnaround, rather than relying on media classifications of the president's performance.

Regression

Regression is appropriate when the goal is to find the best fitting variables (or linear model) to answer the research question (Gravetter & Wallnau, 2011). Linear regression is appropriate for a continuous dependent variable, whereas logistic regression is appropriate when the dependent variable is dichotomous or multinomial. Three studies (McNaughtan 2016; Monks, 2012; Tekniepe, 2014) relied heavily on regression analysis to support predictive models for presidential turnover in higher education.

Monks (2012) investigated presidential job turnover in US institutions of higher education from 2001-2006. Specifically, he sought to understand differences between the average length of time among public and private university presidents over a five-year period and their reasons for leaving their institutions. Variables included personal characteristics such as age, gender, race/ethnicity, and field of highest degree, and institutional characteristics such as control (public or private) and type (baccalaureate, masters or doctorate). Additionally, Monks' study sought to pinpoint specific reasons why job turnover was higher among presidents serving public institutions of higher education than presidents of private institutions. Monks utilized data from the 2001 and 2006 installments of the ACE *College President Survey* to create a single dataset of 787

institutions who participated in both survey years and had complete information on the president's length of time in office (as of the date of the survey). Additionally, Monks merged the data with salary information obtained from the *Chronicle of Higher Education's* online database on executive salaries. Because reports of presidents' salaries only began in 2004, data could only be matched to presidents in the 2006 survey (Monks, 2012).

Monks (2012) employed logit estimation, multinomial logit, and ordinary least squares (OLS) estimation to answer his research questions. In all cases, the results demonstrated that regardless of institution type (public or private), the president's age and having a degree in the social sciences or business were related to presidents leaving office in the five-year period (Monks, 2012). Logit estimation was used to determine whether public presidents are more likely to leave their institutions than their private counterparts over the five-year period. The dichotomous dependent variable was whether the 2001 incumbent departed the office of president of his/her institution by the 2006 survey. Monks found that public university presidents, depending on the length of time in office, had 56% greater odds of departing their institutions earlier than their counterparts in private institutions.

Next, multinomial logit regression was used to compare the reasons for departure among public and private university presidents. Monks initially explored six reasons for leaving office (retired, university appointment, non-academic appointment, private university presidency, public university presidency, and other), but due to small and even zero sample sizes, had to collapse the data into three dependent variables (retired, took

other job, or took new presidency) (Monks, 2012). Monks found that public university presidents were more likely to depart their institutions to assume the presidency at another institution over the five-year period.

Finally, Monks used OLS estimation to examine overall job stability among presidents during 2001-2006. The dependent variable was the natural log of length of time in office. Overall, he found that time in office increased during this period, yet, compared to their private counterparts, public university presidents had shorter average term lengths. Monks proposed that one reason for this difference was due to the lower rate of salary growth among public university presidents. He found that salary increases by approximately 3.6 percent each additional year a private university president remains in office, compared to 0.3 percent for each year a public university president remains in office. Given the aim of Monks' study and the dichotomous and multinomial nature of his dependent variables, logistic regression was an appropriate method. However, data were derived from the *College President Survey* which meant that the analyses were based on completed tenure at the time of the survey, rather than full tenure.

Tekniepe (2014) applied a career movement model based on push-pull motivation theory (associated with executive CEOs), to predict presidential turnover, the dependent variable. Tekniepe reasoned that college and university presidents also function in a similar capacity as CEOs and face the same occupational pressures common to top leadership positions (Tekniepe, 2014). Tekniepe's study focused on the effects of political strife between governing boards and college presidents, internal and external

stresses from faculty and community stakeholders, and fiscal performance on presidential turnover (as measured by push- or pull-induced departures).

Tekniepe's study employed a sample of 101 current community college presidents, across 34 states, who had held a previous presidency in another institution. Participants responded to a web-based survey administered in October 2012. Respondents who indicated that they changed positions for career advancement opportunities aligned with personal goals and objectives were coded as pull-induced departures. Respondents who indicated that they left their prior position because of differences with the governing board or internal/external stakeholders were classified as push-induced departures. Tekniepe stated that he chose to analyze the data using logistic regression rather than discriminant analysis because presidential turnover was a binomial variable and logistic regression assumptions were more lenient (Tekniepe, 2014). Tekniepe stated that overall, the model correctly classified presidents to their respective group (pull-induced or push-induced) 85% of the time.

Given the nature of the dependent variable, logistic regression was an appropriate analytic approach. However, this study had limited generalizability to community college presidents and suffered from self-selection bias (Groves et al., 2009). Approximately seventy percent (70%) of the sample were classified as pull-induced departures (n=71). In other words, because the sample only included presidents in a second presidency, it is plausible that presidents who changed institutions due to push-induced factors did not respond to the survey. Also, more than fifty percent of community college presidents in

the sample served rural communities and institutions with a full-time enrollment of 5,000 or less, regardless of departure type.

In a similar vein, McNaughtan (2016) applied a person-organization fit (POF) framework to identify factors associated with declining college presidential tenure. His conceptual framework bridged personal and organizational characteristics in an effort to capture the interaction between them. Specifically, McNaughtan sought to understand what organizational and demographic factors were associated with decreasing tenure and whether they differ by institutional type; the association between fit and tenure; whether the relationship between organizational fit and turnover changed over time; and, whether the relationship varies by institutional type.

Applying negative binomial regression and event history analysis to three waves of the ACE *College President Survey* data (2001, 2006, and 2011), McNaughtan found evidence of supplementary and complementary fit. Where presidents' goals and values were aligned with those of the institutions', the likelihood of returning for another year increased. Likewise, where presidents' skills and expectations matched their institution's, the likelihood of a longer tenure increased. One limitation that the author noted was the fact that there were 10% missing data in the explanatory variables (which he imputed). Another limitation was the potential of self-selection bias in the ACE survey. For example, responses from two-year presidents increased between 2001 and 2011 while the number of four-year presidents responding to the survey declined (McNaughtan, 2016).

Longitudinal Analyses

Longitudinal analyses such as time series, event history, or survival analysis are appropriate when questions seek to examine trends over time. As mentioned earlier, Wofford (2014) and Röbken (2007) initially planned event history and time series analyses, respectively, but due to limitations on data collection, they had to settle for correlational analyses. Another problem found in several studies was related to the definition of tenure. Surveys and longitudinal data mostly captured information on presidents that were still in office and used the number of years completed thus far as a measure of tenure. To mitigate this problem, and to examine whether there were certain aspects of a president's performance that a governing board emphasized as his/her tenure increased, Langbert (2012) used maximum likelihood estimation for the tenure model, rather than ordinary least squares regression, which can produce inconsistent and biased parameter estimates. He estimated the hazard rate of tenure with the Weibull distribution and Tobit estimation, to compare both the conditional means (Tobit) and duration of tenure.

Padilla and Ghosh (2000), on the other hand, used five-year intervals (pentads) to examine presidential tenure beginning with the 1950-54 cohort up to the 1985-89 pentad. They defined tenure as start-to-end tenure, which included the number of years completed plus any additional or remaining years until retirement or other separation from the institution. Padilla and Ghosh used survival models on a sample of 200 presidents of Research I institutions (excluding interim or acting presidents) to measure declines in presidential tenure and to estimate the probabilities of full tenure. They aimed

to update the existing research as well as apply new and more powerful statistical methods to the study of presidential tenure in higher education. While Padilla and Ghosh did not expound upon the study's research design, sampling, data collection or analytic procedures in this article (Padilla & Ghosh, 2000), two other articles (Padilla, 2004; Padilla & Ghosh, 1999) published by the authors using this same dataset referenced that survey methodology was used to collect the data.

Structural Equation Modeling

Structural equation modeling (SEM) refers to a family of related statistical techniques that can be applied to experimental and nonexperimental designs, allowing researchers to systematically quantify and test a theory about a phenomenon of interest (Kline, 2011). Structural equation models are also utilized in construct validation (Benson, 1998; Garver & Mentzer, 1999) and theory development (MacCallum & Austin, 2000). SEM is advantageous to other statistical methodologies in that it typically involves latent variables, is fit to covariance or correlation matrices, takes into account measurement error in independent or predictor variables (unique to SEM) and provides ease in testing multifaceted multivariable models, including computation of direct and indirect effects and standard errors for pertinent estimates (Raykov & Marcoulides, 2006). SEM is also considered a linear modeling technique and shares common features with other linear approaches such as the assumption of a linear relationship between observed and latent variables and the ability to compare models (Raykov & Marcoulides, 2006). One advantage of SEM over other linear models is that it minimizes the difference between a sample-based and model-based covariance matrix. In other words, parameters

(e.g., effects, relationships, errors) are estimated from sample-based data. The most common types of structural equation models are path analysis models, confirmatory factor analysis models, structural regression models, and latent change models.

Applications of Structural Equation Modeling in Higher Education

Structural equation models have been applied to logistics (Garver & Mentzer, 1999), operations management (Shah & Goldstein, 2006), psychological research (Hershberger, 2003; MacCallum & Austin, 2000), and strategic management research (Shook, Ketchen, Hult, & Kacmar, 2004). In educational research, structural equation modeling has been applied to studies on college student persistence (Nora, 1987; Pascarella & Terenzini, 1983) and faculty intent to leave their institutions of higher education (Johnsrud & Rosser, 2002; Smart, 1990). These lines of educational research run parallel to presidential longevity and tenure in that they examined factors of person and institution fit, and how the interaction of personal and institutional characteristics influence departure or intent to depart the institution. However, no studies have specifically applied this technique to the study of presidential longevity and tenure in higher education, and previous applications of SEM in higher education are dated.

Applications of structural equation modeling within the higher education context began with seminal research on college student persistence and retention. Pascarella and Terenzini (1983) applied a path analytic model to validate Tinto's (1975) student integration model, and Nora (1987) employed a structural regression model to examine determinants of retention among Chicano college students. Other research, not explicated in this literature review but worth mentioning, extended Pascarella and Terenzini's initial

path analytic approach to include multiple institutions (Pascarella & Chapman,1983), compare traditional institutions to commuter colleges (Cabrera, Nora and Castaneda, 1993) and to understand how finances affect college student persistence (Cabrera, Nora & Castaneda, 1992).

Pascarella and Terenzini (1983) employed a path analytic model to validate Tinto's (1975) conceptual model of voluntary student dropout from college and to test hypothesized interactions between academic and social integration and institutional and goal commitment. Five constructs depicted in Tinto's model were operationalized: background characteristics, initial commitments (to the institution and ultimately graduating), academic and social integration, subsequent goal and institutional commitment, and withdrawal decisions. The researchers stated that they placed primary emphasis on the explanatory nature of academic and social integration because Tinto's model was adapted from person-environment fit theory (Pascarella & Terenzini, 1983).

Pascarella and Terenzini chose a longitudinal design, collecting data at three intervals over two academic years (1976-1977 and 1977-1978) on students at a residential university. Questionnaires were distributed to a sample of students at the beginning of freshman year and during the Spring of their freshman year. The early Fall questionnaires were designed to capture students' background information and their initial expectations about their college experience, and Spring questionnaires aimed to obtain their perspectives on their overall freshman year experiences. Data was also collected from student records in the Fall of their sophomore year. The final sample contained 763 students.

The path analysis involved a sequence of seven structural equation models for the overall sample and by gender. Statistically significant paths at $p < .05$ were retained at each stage until the final 'reduced' path model was obtained (p. 219). Paths were also retained in the model at $p < .10$ if the path was theoretically important or in the absence of a statistically significant path at $p < .05$ leading to an endogenous variable (Pascarella & Terenzini, 1983). In addition to path analysis, the authors also used discriminant analysis to correctly classify students into groups and to parsimoniously place variables into the model to understand sources of variance.

Overall, the researchers' findings supported Tinto's theoretical model of college student persistence, and even more significantly when the model was disaggregated by gender. Pascarella and Terenzini (1983) noted that the background characteristics and initial goal commitment variables did not have a direct effect on persistence, suggesting in terms of person-environment fit theory, what happens after the student arrives at the institution is what determines whether they will remain. However, the study was limited to only one institution and a one-year sample. More importantly, the results may be a direct reflection of how the dependent variable (freshman year persistence/withdrawal) and other salient constructs were operationalized (Pascarella & Terenzini, 1983). For example, had Pascarella and Terenzini operationalized academic and social integration or goal commitment and institutional commitment as latent constructs, which one could argue are unobserved, they could have used a different structural equation model (e.g., structural regression). In doing so, they would be able to not only test Tinto's model but also validate, through confirmatory factor analysis (the measurement portion of the

structural regression model), whether the set of specific indicators used to measure the constructs were appropriate.

Nora (1987), on the other hand, applied a structural regression model, rather than path analysis, to Tinto's (1975) model of student retention. Structural regression was preferred rather than path analysis because the measurement model (confirmatory factor analysis) and structural model (path analysis) are combined into a "complete model" (Nora, 1987, p.41), where parameters from both models can be estimated at the same time, rather than employing two separate procedures. In Nora's model, the dependent variable, retention, and academic and social integration (intervening variables), were treated as unique latent constructs. The other intervening variable combined institutional and goal commitments into a single latent construct (institutional/goal commitments).

Additionally, Nora operationalized three latent background variables (high school grades, parents' education, and encouragement from significant others) to test an overall model with a total of seven latent constructs (Nora, 1987). Nora noted that unweighted least square (ULS) estimates were used in data analysis rather than maximum likelihood estimates because the dependent variable, retention, was derived from one continuous and one dichotomous variable, requiring a polyserial correlation matrix. She also noted that another observed variable (credentials earned) was nonnormally distributed, further justifying her use of ULS estimates.

Using data from a final sample of 227 survey respondents who were full-time and part-time students that attended three community colleges in southern Texas in 1977 or 1978, Nora tested four different structural equations in an iterative fashion to determine

the direct, indirect, and total effects that the latent constructs had on Chicano student retention rates. The first structural equation determined the effect of the background variables on institutional/goal commitments. The second structural equation tested the effect of institutional/goal commitments on academic integration. The third structural equation assessed the effects of institutional/goal commitment, encouragement and background variables on social integration. The final structural equation examined the effects of students' background variables, institutional/goal commitments, academic integration and social integration on retention. The study found no significant direct effect between academic and social integration and retention, which contradicted previously reported results (Nora, 1987).

Other notable applications of structural equation modeling in higher education examined the intentions of faculty to leave their institutions (Johnsrud & Rosser 2002; Smart, 1990). Smart (1990) proposed and tested an explanatory structural equation model of faculty intentions to leave their institutions. The model contained measures of individual and organizational characteristics, such as age, gender, research time and campus governance; contextual variables such as salary and research productivity; and job satisfaction, which included salary, career and organizational satisfaction. The dependent variable was intent to leave their current institution for another position, whether academic or non-academic. Smart posited that the dependent variable, intent to leave, was "causally dependent on all preceding variables" (Smart, 1990, p. 409). Smart supported his use of causal models for their ability to explain significant variability,

support theories of causation, and apply findings to subgroups from the population under study (Smart, 1990).

The fully recursive model theorized that individual and institutional characteristics are mediated through contextual, work environment measures, and dimensions of faculty job satisfaction to affect faculty intention to leave their institution. Smart used a sample of 2,648 full-time, faculty with earned doctorates obtained from the 1984 Carnegie Foundation for the Advancement of Teaching national survey of faculty to test the model. The structural equations were estimated by tenured and non-tenured faculty after preliminary analysis revealed significant group differences. Smart found that regardless of tenure status, intention to leave is mostly influenced by age, declining institutional performance in terms of enrollment and finances, autocratic governance structures and low levels of career and organizational satisfaction (Smart, 1990).

Johnsrud and Rosser (2002), building on the work of Smart (1990) used multilevel structural equation modeling to gain a better understanding of and interactions between faculty worklife, morale, and intentions to leave, and the extent to which these relationships reside within and between faculty groups. Specifically, the researchers used a sample (n=1,511) from all institutions within a 10-campus system, to test the direct and indirect effects (between institutions) of structural variables, mediated through perceptions of worklife and morale on faculty intent to leave. At the same time, they also tested direct and indirect effects of demographic variables (within individuals), mediated through perceptions of worklife and morale on faculty intent to leave. Johnsrud and Rosser concluded that the study did better at explaining morale (a mediating variable)

than it did explaining faculty intention to leave their current institution. No statistically significant differences were found between demographic and institutional characteristics on intent to leave across institutions. In discussing the limitations of the study, the authors acknowledged that "any structural model that attempts to reduce the complexity of organizational life to a series of measured variables is necessarily incomplete … [and that] these three constructs measured are not the only ones that could be measured" (Johnsrud & Rosser, 2002, p. 522).

Theoretical Framework

The theoretical framework for this study is derived from the literature review presented earlier in this chapter and posits that using a dataset derived from publicly available data on past presidents of R1 and R2 universities to test a structural equation model is a viable methodological approach for research on presidential longevity. Research on presidential longevity in higher education have primarily used surveys, a variety of statistical methods to investigate associations among relevant variables and have progressed toward more sophisticated quantitative techniques and theoretical frameworks; none to date have tested hypothesized causal paths among salient variables. However, causal paths have been investigated in research on student and faculty persistence in higher education using structural equation modeling. This study proposes collecting data from institutions' publicly available websites and other public sources on several variables of interest based on presidents' full tenure (i.e., start-to-end dates). The advantage of using publicly available data is that it provides an opportunity to capture post-presidency activities and full tenure – two variables of interest that have not been

obtained from surveys of sitting presidents. Furthermore, this study aims to provide a methodological contribution to the literature because it explores the feasibility of using a publicly-derived dataset to test a causal model of presidential longevity.

Advantages of a Dataset Derived from Publicly Available Data

Deriving a dataset from publicly available data on the internet is unobtrusive and provides an opportunity to addresses some of the challenges described in the literature related to instrumentation constraints, sampling, and missing data. One primary instrument constraint observed in the literature related to the use of pre-existing survey data to answer research questions. The *College President Survey* (CPS) has been the primary source of data on presidential leadership and tenure in higher education since 1986 (American Council on Education, n.d.). Data is collected approximately every five years on sitting presidents' background characteristics and institutional activities. In the *College President Survey*, tenure is computed based on how long the individual completing the survey has been in the position as of the date of the survey, rather than on the length of time they served from start to finish. In other words, data from the *College President Survey* is therefore incomplete because we do not know how long presidents who responded to the survey will serve. For example, in the 2016 survey, 37.1% of presidents stated that they anticipate departing in 3-5 years, but some may leave sooner than three years or stay much longer than five years (Gagliardi et al., 2017). By using publicly available data rather than surveys, this study addresses the limitations of instrumentation because presidents' actual start-to-end dates and post-presidential activities will be captured from archived data.

Sampling constraints are also closely tied to instrumentation. To obtain a large enough sample to conduct analyses, researchers must often choose a data source or sample that may limit the scope of the research question or design. In the literature, survey data (preexisting or self-designed for the study) on sitting presidents was the primary data source. With survey data, however, the researcher must consider threats to validity and reliability such as self-response and self-selection bias, survey fatigue, and limitations in accessing the participants to which the surveys are to be administered (Groves et al., 2009). University presidents, primarily Research 1 presidents and even more so past presidents, are generally assumed to be a hard to access population. Acquiring data through unobtrusive means such as the internet therefore mitigates bias, accessibility and other sampling constraints.

Large amounts of missing data would present a real threat to the research design, as was the case for Wofford (2014), who built her dataset with publicly available data. For example, the TARU measures that she collected did not necessarily have rankings for every school on each of the nine categories of accountability. Thus, the missing data limited the scope of Wofford's proposed analysis. Nonetheless, the proposed study's rigorous design (described in Chapter III) alleviates missing data issues.

Advantages of Structural Equation Modeling

Two studies (McNaughtan, 2016; Tekniepe, 2014) applied person-organization fit theory to develop an integrated framework of presidential turnover and tenure, focusing on how the interaction of presidents' personal and institutional characteristics influence presidential tenure. However, the researchers did not operationalize latent constructs or

estimate the variables of interest in a causal model. Nonetheless, earlier studies (Nora, 1987; Pascarella &Terenzini, 1983) on college student retention which tested Tinto's (1975) model of college student dropout (based on person-environment fit theory), used structural equation modeling to test interactions between student background characteristics and institutional goals and commitments. Thus, applying structural equations to increase understanding of presidential longevity in higher education can fill gaps in the literature about theory refinement and validation of constructs that have been proposed but not operationalized.

Theory Refinement. Structural equation modeling allows us to test alternative models in refining theory because *a priori* model specification must precede data collection (Kline, 2011). In the literature review presented in Chapter II, studies progressed toward conceptual and/or theoretical frameworks modeling person-organization fit (McNaughtan, 2016) or push-pull motivation theory (Tekniepe, 2014). The integrated frameworks are a step in the right direction because they provide an opportunity to estimate complex models while capturing all sources of measurement error. Moreover, SEM would be appropriate because theorized causal paths can be explored in greater depth, constructs operationalized and tested, and sources of measurement parsed out more specifically. Other linear approaches typically do not consider or assume measurement error in explanatory or independent variables (Raykov & Marcoulides, 2006), leaving a lot of measurement error unexplained.

In the proposed conceptual model (Figure 1), theory refinement, for example, would occur in both the structural (relationships between latent variables) and

measurement parts (definition of latent constructs) of the structural model. The structural model would test fit theories positing that personal motivation and presidential readiness directly influence presidential longevity, as well as the theory that these latent constructs indirectly affect presidential longevity through mediating latent variables such as institutional commitment.

Construct Validation. Another advantage of SEM is that it provides an opportunity to test whether post-tenure or post-departure data on presidents is sufficient to validate latent factors or test theoretical models. One observation from the literature is that studies either considered the model before collecting the data (Howell, 2011; Langbert, 2012; McDonald, 2012; Röbken, 2007; Tekniepe, 2014; Wofford, 2014) or the researchers used existing datasets and built the model based on the dataset to test their theories (Birnbaum, 1971, 1989; Johnsrud & Rosser, 2002; McNaughtan, 2016; Smart, 1990). Studies that collected their data were limited by sample size and access to a more representative sample of institutions of higher education in the U.S. These studies relied heavily on community college presidents, which limited their ability to generalize the results to a larger segment of the population of college and university presidents. Limited generalizability was likely a result of sampling from a population that is difficult to access. As a result, the authors proposed narrowly focused questions examining associations or relationships between variables, may have omitted important variables and made limited attempts to extend the analysis to investigate the interactions between variables.

The structural model proposed in this study provides an opportunity to validate the proposed constructs (personal motivation, presidential readiness, institutional commitment, and presidential longevity) through the measurement part of the model and include variables omitted in prior studies. Empirical literature using integrated frameworks have not included the institution's prestige as an indicator of institutional commitment or fit. Thus, it has been included in the proposed conceptual model. Similarly, presidential longevity has primarily been described in terms of either completed tenure or full tenure alone. However, scholars posit that age when leaving the presidency (Cohen & March, 1974) and post-presidential activities (Monks, 2012; Reed, 2002) may also have a significant impact on presidential longevity. Therefore, this study provides an opportunity to operationalize and test the efficacy of presidential longevity as a latent construct that not only influences full-tenure, but also the president's age when s/he left the presidency and their post-presidency activities.

Conceptual Structural Model

Literature supports the belief that presidential longevity is influenced directly by presidents' background and career history, and indirectly from the interaction of presidents' background and pre-presidential activities (i.e., career) with the institutional environment where they serve as president. This study goes a step further to operationalize and integrate salient variables already established in the literature into latent constructs and test a structural model of presidential longevity among U.S. Research 1 and Research 2 university presidents.

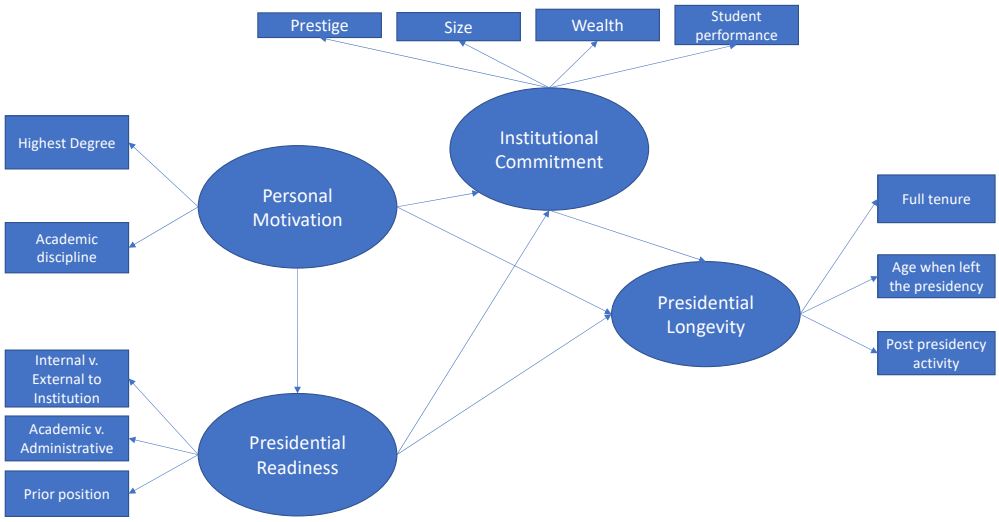


Figure 1. Conceptual Model of Presidential Longevity

Figure 1 provides a visual example of the full causal model proposed in this study. A structural regression model is recommended to simultaneously estimate parameters for the measurement model (definition of latent variables) and the structural model (i.e., the relationship between the latent variables) (Kline, 2011). While the labels assigned to the constructs are theoretically meaningful, other labels could also be used that are also conceptually aligned and convey similar meanings. Nevertheless, the measures of the proposed constructs have been established in the literature.

The exogenous latent variables depicted in this study are personal motivation and presidential readiness. Personal motivation describes an individual's eagerness or motivation to succeed in higher education and is theorized to relate to the president's highest degree earned and the discipline in which the highest degree was obtained (Birnbaum & Umbach, 2001; Monks, 2012; Reed, 2002). Presidential readiness describes an individual's preparedness for the job of chief executive at an institution of higher

education. In the literature, presidential readiness is related to the pre-presidential career track, specifically whether the president moved up the ranks in his/her current institution or pursued an academic or administrative career track before attaining the presidency (Birnbaum, 1971; Birnbaum & Umbach, 2001; Reed, 2002).

Institutional commitment represents a mediating or intervening endogenous variable that describes the president's sense of fit with the institution's goals and objectives. Studies that have applied person-environment fit theory to studies of presidential tenure and longevity have found associations between presidents' commitment to institutions with certain characteristics such selectivity (Birnbaum, 1971), student performance (McNaughtan, 2016), prestige (Beardsley, 2015) and wealth (Röbken, 2007). The endogenous dependent latent variable is presidential longevity. Presidential longevity is argued to influence presidents' full tenure, the president's age when they leave the presidency (Cohen & March, 1974), and their post-presidency activities (Birnbaum, 1971; Monks, 2012; Reed, 2002).

Summary of the Literature

Literature relating to presidential longevity in higher education demonstrates that empirical studies have been sparse and intermittent for several decades, but there appears to be renewed interest in the topic in the past five years. In recent publications, scholars have incorporated advanced statistical techniques and proposed frameworks that integrate personal and institutional characteristics into one model (Langbert, 2012; NcMaughtan, 2016; Tekniepe, 2014), but research studies examining the interaction between personal and institutional characteristics in the structural model have not been conducted to date.

One major area of concern was that there was no consistent definition of presidential tenure used in the research.

Table 1 provides a summary of the research by data collection method and analytic technique. While the use of surveys was the dominant form of data collection, a few studies did use publicly available data to build their datasets. Additionally, the most common analytic procedures employed in recent studies on presidential longevity were correlational and regression analyses. As a reminder, empirical studies utilizing structural equation modeling focused on faculty and students' intent to leave or persist in their institutions, not on presidents.

Table 1

Count of Empirical Studies by Data Collection Method and Analytic Technique

Data Collection Method	**Count**
Survey	14
Interview	2
Publicly available data	4
Data Analytic Techniques	
Content Analysis (qualitative)	2
Analysis of Variance (ANOVA)	3
Correlational Analysis	6
Regression	5
Longitudinal Analyses (Survival, event history, etc.)	3
Structural Equation Modeling*	4

Note. Studies directly related to presidents (n=12). Studies using more than one statistical technique (n=5).
* Studies utilizing SEM did not include university presidents, only students and faculty.

Overall, the research designs were appropriate for the research questions posed in the studies. However, most studies acknowledged limitations such as generalizability and self-response and self-selection bias, a weakness related to instrumentation and sampling (Groves et al., 2009). For example, studies utilizing surveys were conducted on sitting presidents who had not yet completed their tenure and might still have been a few years away from actually leaving the presidency. Only two studies (Padilla & Ghosh, 2000; Röbken, 2007), which are dated, utilized data on past presidents' full term in office to explore trends in presidential turnover. Padilla & Ghosh (2000) used survival analysis to make predictions about future trends among research university presidents, and Röbken (2007) used full tenure to examine the relationship between tenure and organizational size among German universities. Nonetheless, over time, studies progressed toward more advanced techniques and theoretical frameworks, offering hope for other quantitative methods that have not yet been applied to this topic.

CHAPTER III

METHODOLOGY

Prior research on presidential longevity in higher education has primarily been conducted using survey methodology and quantitative statistical techniques. This study aimed to fill a methodological gap in the literature through a mixed methods design employing a dataset derived from publicly available data and structural equation modeling. Specifically, this study involved descriptive research on the process of acquiring a dataset from publicly available data on past university presidents and then used the dataset to test a structural model of presidential longevity statistically. In the literature presented in Chapter II, Langbert (2012), Monks (2012), Röbken (2007) and Wofford (2014) each used publicly available data to conduct quantitative analyses; however, the focus of their research was not on the data collection strategy or qualitative analyses of the dataset. Additionally, structural equation modeling had been used in research on faculty and student intent to persist or leave their IHEs, but structural models have not been used to investigate presidential longevity. This study aimed to merge the two methodological approaches to advance and expand the literature on presidential longevity.

Chapter III begins with a description of the research design, including the population, sample and data sources. Next, data collection procedures are described with an explanation of the steps taken to ensure data quality. The chapter concludes with a

discussion of the data analytic procedures for the qualitative and quantitative data and the merging of these data.

Research Questions

Four research questions guided this study on presidential longevity in higher education:

RQ1: What are the challenges and/or opportunities associated with obtaining a dataset derived from publicly available data to conduct advanced statistical analyses?

RQ2: To what extent can a dataset derived from publicly available data be used to test a structural model of presidential longevity in U.S. R1 and R2 universities?

RQ3: Given a dataset derived from publicly available data, what structural model best supports the theory of presidential longevity in U.S. R1 and R2 universities?

RQ4: To what extent do the factors that influence presidential longevity differ among presidents of public and private R1 and R2 universities?

Research Design

The research questions guiding this study necessitated a nonexperimental, convergent mixed methods design (Creswell, 2014, 2015). Nonexperimental mixed methods research can be used when the research questions cannot be answered with quantitative methods or qualitative methods alone, or the study warrants more data and a more comprehensive understanding of the problem than either method can singly provide (Creswell, 2015). First, the study qualitatively analyzed the process of deriving a dataset

from publicly available data and the extent to which the data were useful in structural equation modeling. A qualitative research approach is characterized by a focus on "process, understanding, and meaning; the researcher is the primary instrument of data collection and analysis; the process is inductive; and the product is richly descriptive" (Merriam, 2009, p. 14). However, one major disadvantage of qualitative research is its limited generalizability to large groups of people (Creswell, 2015).

Next, the dataset derived from publicly available data was used to test a theory of presidential longevity among past presidents of R1 and R2 institutions using structural equation modeling. Quantitative research is employed when research questions aim to examine relationships between variables or judiciously reduce a set of variables to statistically test a theory; however, the research is mostly researcher driven, and insight about the data or participants is limited (Creswell, 2014). Hence, combining both methods in a study mitigates methodological limitations. Thus, a convergent mixed methods design was appropriate because the goal of the study was to merge quantitative and qualitative data to better understand presidential longevity (Creswell, 2014) and to produce more insightful and generalizable results (Creswell, 2015).

Population

The population of interest was presidents who were in office on July 1, 2000, at U.S. doctoral-granting universities classified by the Carnegie Classification of Institutions of Higher Education™ as R1: Highest research activity and R2: Higher research activity. Research universities were selected as the population of interest because they have high levels of research activity, are very complex, prestigious, and

receive lots of publicity; yet, they are relatively stable over time and during times of presidential vacancies, there is heavy competition for those jobs (Padilla & Ghosh, 2000). Presidents of such institutions are described as a homogenous group that faces the same pressures to secure external funding, increase enrollment, and maintain stakeholder relationships (Mueller, 1994; Padilla & Ghosh, 2000). Furthermore, these institutions were selected for ease of data collection. IHE websites are easy to access, and the data contained in IHE websites are assumed to be accurate (O'Leary, 2017; Wofford, 2014).

All R1 (n=115) and R2 (n=107) institutions were combined into a total population of 222 IHEs to ensure an adequate sample size for the statistical analyses. These 222 IHEs comprise 66.3% of all doctoral-granting research universities in the United States. A random sample of 200 institutions was initially selected from the population because a sample size of approximately 200 is recommended to obtain stable results in structural equation modeling (Kline, 2011). However, as data collection proceeded and data for some presidents and/or institutions became challenging to locate, all 222 institutions were included in the sample to ensure an adequate sample size for the statistical analysis. The full dataset included records for 215 presidents. Six IHEs for which the former or interim presidents' names could not be determined were excluded from the final sample: University of Puerto Rico, University of Colorado Denver, Colorado School of Mines, University of Tennessee-Knoxville, The New School, and Montana State University. One other institution was excluded because their structure did not fit the criteria for the study. The Naval Postgraduate School was omitted from the sample because the leadership was

listed as superintendents and appeared to change leadership every 2-3 years systematically.

July 1, 2000, was selected because the most recent study (Padilla & Ghosh, 2000) using research universities (specifically R1s) tracked presidential longevity until 1990. The year 2000 was chosen because by the year 2000, internet usage was considered mainstream (National Academy of Sciences, 1999; Spiegel, 1999), thereby increasing the potential to locate additional digital resources (beyond institutions' websites) on presidents whose terms primarily spanned the 1990s. July 1 was specifically chosen because it is usually the start of an institution's fiscal year and thus, a common presidential start date. Therefore, sampling presidents in office as of July 1, 2000 ensured a cross-section of presidents who served through the 1990s as well as through early the 2000s. Furthermore, for presidents who began serving in 2000 and remained longer than ten years, this study provides the most up to date research on presidential tenure and longevity.

Sample

Average tenure among past presidents was 11.4 years. Seventy-seven percent of presidents who were in office on July 1, 2000, arrived between 1990 and 1999 (Figure 2). An additional 14% came in the 1980s, and five presidents (2.3%) had been in office since the 1970s. By 2009, 81.4% of former presidents had left their IHEs, with another 14.4% departing in this current decade. The longest presidential term in the sample was 35 years.

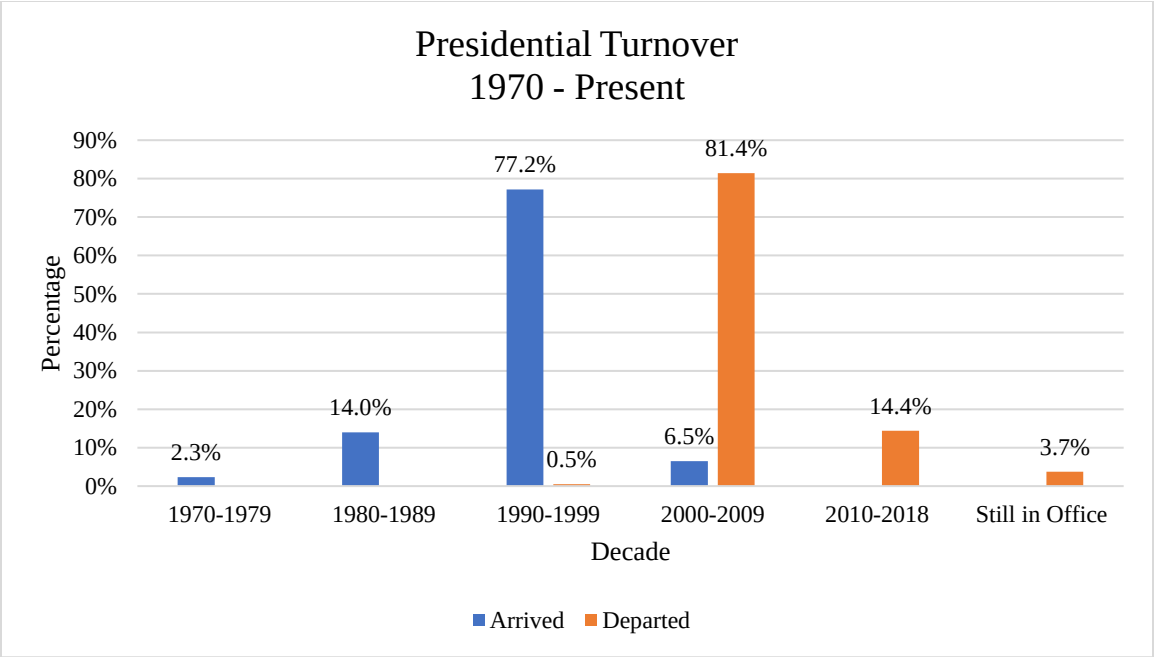


Figure 2. Presidential Turnover 1970 – Present

Overall, the majority of the 215 presidents were white (92%) males (87.5%) who served in public IHEs (70%) and held PhDs (82.8%). The mean age of presidents at the time of appointment was 53.3 years and the mean age at the time of departure from the presidency was 64.7 years of age. Table 2 presents presidents' characteristics by institutional control.

The sample also contained four interim presidents and eight sitting presidents at the time of data collection. Interestingly, the average tenure for the eight presidents who are still in office is 23 years, with a range of 18 to 30 years of presidential service to date. Nonetheless, because the model concerned past presidents only, current and interim presidents were removed from the sample before the quantitative data analysis.

Table 2

Characteristics of Presidents as a Percentage of the Sample by Institutional Control

Characteristics	n	Private (n=64)	Public (n=151)
Status			
Past President	203	27.9	66.5
Current President	8	1.9	1.9
Interim President	4	–	1.9
Gender			
Male	188	28.4	59.1
Female	27	1.4	11.2
Race/Ethnicity			
White	198	28.4	63.7
Black or African American	13	1.4	4.7
Hispanic/Latino	3	–	1.4
Asian	1	–	0.5
Other	1	0.5	–
Academic Discipline			
Social Science and Business	53	6.5	18.2
Science and Mathematics	46	5.2	16.3
Humanities, Religion, Arts	45	8.4	12.6
Law and Medicine	34	5.1	10.7
Engineering	25	3.7	8.8
Education	10	0.9	3.7
Unknown	2	–	0.9
Highest Degree			
PHD	178	24.2	58.6
JD	26	3.3	8.8
MBA	2	0.5	0.5
MD	2	0.5	0.5
Other	7	1.4	1.8

Data Sources

Presidential background characteristics and pre- and post-presidential career history were primarily obtained from IHE websites where the president was employed as president, in addition to any other institutions (academic or otherwise) where the president may have been employed before the date of interest. IHE websites were considered a credible source of information because of the increased marketing of higher education to students and families (Saichaie & Morphew, 2014). Other information sources included press releases or news reports that contained additional information on past presidents. A brief pilot of a few websites revealed a lack of consistency in the data provided. For example, where one website provided a full biographical profile on past presidents, another site only listed the name of the former president and years of service. Thus, where background information on past presidents could not be located directly from the IHE's website, a broader search was conducted using internet search engines.

Data Collection

The qualitative aspect of this study aimed to describe the process and efficacy of a dataset derived from publicly available data and to aid in the interpretation and discussion of the quantitative results. Qualitative research follows an emergent design that precludes knowing in advance who all the participants will be, the specific questions that will be asked and where to go next during data collection (Merriam, 2009). In this study, it was expected that each piece of data collected would inform the next steps. For example, after the first record was obtained, it was realized that other kinds of data needed to be collected.

Moreover, qualitative researchers suggest that during the data collection process, the researcher "should purposefully seek data that might disconfirm or challenge your expectation or emerging finding" (Merriam, 2009, p. 219). Negative or discrepant cases also establish the credibility of the data (Creswell, 2014; Merriam, 2009). Presidents' biographies were the primary data sources reviewed during the data collection process and a constant source of discrepant information. Biographies provided insights about the variables of interest, proposed latent constructs, or alternate theories about presidential longevity. Discrepant information was documented and recorded for later analyses.

Qualitative data consisted of general observations, notes regarding data availability, data quality, and data sources, in addition to the web address (i.e., URL) where data was obtained. Data were extracted by hand from the internet using a Qualtrics form designed for ease in recording and storing the data. The Qualtrics database also served as the "chain of evidence" and qualitative database throughout the study (Yin, 2014, p.127). All of the qualitative data and URLs were also stored in Qualtrics.

The Qualtrics form captured specific quantitative variables of interest. Table 3 provides a listing of the observed variables that were obtained in the dataset (some variables will be derived). Presidents' biographical information and career history were used as measures of the independent (exogenous) latent variables personal motivation and presidential readiness. The indicators associated with the dependent (endogenous) latent variable, presidential longevity were primarily derived from other variables of interest in the dataset. Items assumed to influence presidents' institutional commitment; the intervening latent variable was to be obtained from IPEDS. However, this component

of the study was tabled for future research after the data collection process suggested that another analytic approach would be a more suitable alternative to examine presidents' institutional commitment. Model adjustments are described in detail in Chapter IV.

Table 3

Data Collection Fields for Observed Variables

Variable	Code	Supporting Research
Personal Characteristics		
President ID		
President's Name		
President's Institution		
Status of President	Current, Past, Interim	
President is the X number in the university's history		
Gender	Male/Female	Reed, 2002
Race/Ethnicity	White, Black or African American, American Indian or Alaska Native, Hispanic/Latino, Asian, Native Hawaiian or Pacific Islander	Reed, 2002
Age at time of appointment to the presidency	Actual age	Reed, 2002; Smart, 1990
Date of Birth	Actual	
Highest Degree	PhD, EdD, JD, MD, MBA, Other	Monks, 2012; Birnbaum & Umbach, 2001
Name of Institution where highest degree earned		
Academic discipline/field	Science and Math Engineering Social Science and Business Humanities, Religion, Arts Education Law and Medicine Other	Monks, 2012; Birnbaum & Umbach, 2001
Alumni of the institution where president?	Yes/No	Langbert, 2012

Career History		
Origin of candidacy for president (internal/external)		Birnbaum, 1971; Reed, 2002; McNaughtan, 2016
Prior positions held by the president	System President/Chancellor President/Chancellor Interim President/Chancellor Vice President/Chancellor Provost / Chief Academic Officer Other Senior H.E. officer Dean Department Chair Faculty None	Reed, 2002; Birnbaum & Umbach, 2001
Immediate prior position title	System President/Chancellor President/Chancellor Interim President/Chancellor Vice President/Chancellor Provost / Chief Academic Officer Other Senior H.E. officer Dean Department Chair Faculty None	Birnbaum & Umbach, 2001
Name of immediate prior place of employment		Birnbaum & Umbach, 2001
If higher Ed, immediate institution control type		Birnbaum, 1971
Previous experience as president	Yes/No	Tekniepe, 2014
Number of presidencies before presidency at the IHE of interest	Count	Reed, 2002
Sector of the prior presidency	Public, Private	Birnbaum, 1971
Dates of prior presidency	Start/End Dates	
Length of the prior presidency (full tenure)	Derived	
Current president	Yes/No	
Dates of the current presidency	Start/End Dates	
Length of the current presidency	Derived	
Institutional Characteristics		
Name of Institution		
Source of control	Public/private	
President's reporting line	Executive (system/state) Institutional governing board (Board of directors/trustees) System/State governing board	Reed, 2002; Tekniepe, 2014; Langbert, 2012
Number of presidencies in the institution's history		

Presidential Longevity		
Post-presidency activities	Transferred to another presidency Retired Died in office Assumed faculty position Other employment other than faculty position or presidency	Reed, 2002; McNaughtan, 2016
Name of institution where post-presidency activity conducted		
If High Ed, control type of post-presidency institution		
Full tenure	Derived	
Age at departure	Derived	

Finally, media reports indicated that three presidents who were still in office at the time of data collection would retire on June 30, 2018. Since data analysis did not begin until after this date, the three cases were reviewed and verified that the presidents did, in fact, retire by June 30, 2018. Thus, the presidents' profiles were updated to reflect their full tenure.

Ensuring Data Quality

Validity, reliability, and trustworthiness of the data were assured through the use of multiple credible websites, observation, notes, a "chain of evidence" (Yin, 2014, p. 127) or audit trail (Lincoln & Guba, 1985), a Qualtrics database to collect and analyze the data, use of rich, thick descriptions, saturation, triangulation and journaling.

Quantitative Data

To ensure internal validity and reliability of the data the same instrument (e.g., Qualtrics form) was used to populate each record of the dataset and maintained in a database with each URL where data was obtained for each observation. Presidents' data were also triangulated with each source. For example, a mini-pilot of the data collection

process revealed that multiple sources and websites would be needed to capture a complete profile for each president. Thus, during the process of accessing various websites to complete a president's profile, there was constant cross-checking of presidents' background (e.g., degrees, dates of service, age, etc.) and career history with their previous and post-presidential places of employment, as well as other biographical documents. To ensure external validity, the sampling timespan covered presidents who served in the 1990s through the 2010s so that the findings could be generalized to current presidents.

Qualitative Data

Where quantitative data is concerned with threats to internal and external validity and objectivity, qualitative data is concerned with credibility, transferability, dependability, and confirmability (Creswell, 2014; Merriam, 2009). Transferability is important to qualitative research because it helps readers to apply the study's findings to other contexts (Merriam, 2009). Use of rich, thick descriptions and explanatory data aided in conveying and strengthening the transferability of the results. Detailed notes and observations, including selected screenshots, were recorded about the process and quality of the data until saturation was reached. Saturation is achieved when the researcher gets to a point in data collection when the same information is observed, and no new information is obtained as data collection continues (Merriam, 2009). In addition to saturation, negative or discrepant information (Creswell, 2014) was documented and presented in the findings to add to the credibility of the study.

Equally, triangulation uses multiple methods and sources of data to add to the credibility, transferability, and dependability of the findings (Merriam, 2009; Creswell, 2014). Triangulation was employed in this study through a neutral inspection of multiple IHE websites and other reliable digital documents. Finally, the researcher kept a journal that detailed the inquiry process, personal reflections, conflicts and biases. Journaling adds to the credibility of the qualitative data because it clarifies any biases, prejudices or assumptions that the researcher brings to the study and analysis of the data (Merriam, 2009; Creswell, 2014).

Data Analysis

Qualitative Analysis

Qualitative data analysis utilized the constant comparative method (Merriam, 2009; Creswell, 2014). The constant comparative method is a step-by-step process for coding and analyzing qualitative data which allows the researcher to know when saturation is reached. The researcher engaged in an on-going process of recording notes, thoughts, observations, etc. as each website was searched and documents were analyzed. Document analysis (e.g., presidential bios) was on-going during the data collection process as documents provided helpful, objective information throughout the process about the variables of interest and theory of presidential longevity.

The second level of analysis employed a thematic analysis. Thematic analysis is "an independent qualitative descriptive approach" (Vaismoradi, Turunen & Bondas, 2013, p. 400) used to categorize, analyze and report themes or patterns in written, verbal, or electronic textual data. While thematic analysis is considered a flexible approach, it

can provide a rich, thick multifaceted understanding of the data (Braun & Clarke, 2006; Vaismoradi et al., 2013, p. 400) and demonstrate rigor (Fereday & Muir-Cochrane, 2006). Thus, the researcher engaged in a more step-wise process of organizing and comparing pieces of data, including labeling and coding the data into categories based on patterns, recurring words, statements or descriptions in the data. Next, interrelated themes across and within individual presidents' records were identified and interpreted (Creswell, 2014; Merriam, 2009). Another level of thematic analysis examined the extent to which the dataset could be used for structural equation modeling to test the theory of presidential longevity.

Quantitative Analysis

SEM analyses are considered an iterative process involving specification and identification of the model; selecting measures; collecting, screening, and preparing the data for analysis; estimating the model using appropriate software; re-specification of the model if necessary; and reporting the results (Kline, 2011; Raykov & Marcoulides, 2006). Kline (2011) states that *a priori* model specification must precede data collection. The theoretical model guiding this study was depicted in Figure 1 (Chapter II). However, the data collection process and qualitative data analysis resulted in adjustments to the original model (to be discussed in Chapter IV). Following specification, model identification requires degrees of freedom (df_M) ≥ 0 and scaling the latent variables. The proposed structural model was overidentified because degrees of freedom > 0. The model was scaled using unit loading identification (ULI), the preferred method (Kline, 2011).

Once a completed dataset was obtained, the data were cleaned, visually inspected, and descriptively analyzed and described. Additionally, the data were further screened for multicollinearity and missing data. Because most of the data were categorical, only continuous variables were screened and confirmed for multivariate normality. Following these preliminary procedures, the raw data file was uploaded into PRELIS 9.30 (Student) for univariate analysis due to the presence of non-normal data (i.e., ordinal) and to examine patterns of missing data. Six percent of the dataset contained missing values on primarily two variables (presidents' appointment age and presidents' departure age). Once it was determined that the data loss patterns were due to the absence of the president's date of birth and therefore not systematic (Kline, 2011), missing data were imputed using the Monte Carlo Markov chain (MCMC) algorithm in PRELIS. The MCMC algorithm is one of several types of model-based imputation methods that generate plausible values for each missing observation based on observed patterns in the dataset (Rubin, 1996).

The evaluation of the structural model was guided by the two-step rule (Bollen, 1989). Step 1 involves re-specification of the structural model as a confirmatory factor measurement model to determine whether it fits the data. If the CFA fits the data, then move to step 2, which is to analyze the structural model. If the CFA does not fit the data well, then it should be re-specified and re-tested. First, the measurement model was fitted with a polychoric correlation matrix produced from the raw data using LISREL 9.30 (Student), the most recent version. Because the underlying latent variables are assumed to

be continuous, a polychoric matrix best represented the estimated relationships between the continuous latent variable and ordinal indicators in the dataset.

Additionally, the non-normal data violates the normality assumptions of the standard estimators used in SEM (Finney & DiStefano, 2006). Thus, a more robust estimator, Weighted Least Squares (WLS) was used because it does not require the normality assumption and is one of the better methods for estimating categorical and non-normal data (Brown, 2015; Finney & DiStefano, 2006; Kline, 2011). WLS estimation performed well with SEM involving categorical and ordinal data and large sample sizes (Flora & Curran, 2004). Finally, the most common fit indices (Kline, 2011) were used to assess model fit: Weighted Least Squares Chi-Square; Steiger-Lind root mean square error of approximation (RMSEA; Steiger, 1990), Bentler Comparative Fit Index (CFI; Bentler, 1990) and Standardized Root Mean Square Residual (SRMR). Multiple indices provide a more comprehensive way to assess the overall fit of the model (Kline, 2011).

The measurement model was evaluated to confirm that the correct number of latent constructs had been specified and to determine the extent to which the observed variables were correlated. Once the fit of the measurement model was assessed, the structural model was tested. Model parameters were presented and interpreted for the CFA and the full structural model. Finally, the study's findings were compared to past research to demonstrate what has been learned (or not learned) by utilizing SEM and operationalizing the constructs.

Mixed Methods Analysis

Discussion of the quantitative results was complemented with findings from the thematic analysis of the data collection process.

Chapter Summary

Various advanced statistical methods have been employed to investigate the declining trends in presidential tenure; yet, to date, none have employed structural equation modeling using a dataset derived from publicly available data. This chapter described the convergent mixed methods design that merged quantitative and qualitative data collection and integrated the results to test a structural model of presidential longevity using SEM. This study is significant in that it fills a methodological gap in the literature and advances knowledge and understanding about presidential longevity in higher education.

CHAPTER IV

RESEARCH FINDINGS

This study explored the factors contributing to presidential longevity at U.S. Research 1 and Research 2 institutions. The study aimed to fill a methodological gap and update the literature on presidential longevity. Specifically, the study involved descriptive research on the process of creating a dataset from publicly available data on past R1 and R2 university presidents, then used the dataset to test a conceptual model of presidential longevity statistically. Overall, the data collection process yielded an adequate sample size to examine the structural model on presidential longevity using structural equation modeling. While the researcher encountered similar challenges as past scholars did in using a dataset based on available data, the findings from this study show promise for future research using both the mixed methods approach and theory of presidential longevity to expand scholarship in these areas.

The study was guided by four research questions:

RQ1: What are the challenges and/or opportunities associated with obtaining a dataset derived from publicly available data to conduct advanced statistical analyses.

RQ2: To what extent can a dataset derived from publicly available data be used to test a structural model of presidential longevity in U.S. R1 and R2 universities?

RQ3: Given a dataset derived from publicly available data, what structural model best supports the theory of presidential longevity in U.S. R1 and R2 universities?

RQ4: To what extent do the factors that influence presidential longevity differ among presidents of public and private R1 and R2 universities?

This chapter presents the findings from the qualitative data collection process and quantitative statistical analyses. The chapter is divided into four sections, each representing one of the study's research questions. Each section begins with a summary statement for the research question, followed by a thematic and/or methodologic description of the results. The chapter concludes with a summary of the study's findings.

Research Question 1

What are the challenges and/or opportunities associated with obtaining a dataset derived from publicly available data to conduct advanced statistical analyses?

The benefits of creating a dataset from publicly available data far outweighed the challenges. The study faced similar challenges as prior scholars in that data was based on what was publicly available and, in some cases, was not able to be collected as planned. Also, the process was time intensive and required the use of hundreds of websites. Nevertheless, the sample size and data quality were good enough to proceed to test the structural model of presidential longevity. The results demonstrate that digital sources

such as IHE websites, media coverage of succession events, and online encyclopedias can serve as an alternate data source for studies on university presidents.

A qualitative research approach was used to build a dataset from publicly available data on presidents of Research 1 and Research 2 universities who were in office on July 1, 2000. The dataset includes rich, descriptive data on past presidents' tenure and career history. As described in Chapter III, the data collection followed an inductive process, where each case built upon the next case. In addition to the data extracted by hand from websites and other digital sources, included in the dataset as separate fields were general observations, notes regarding data availability, data quality, and data sources, as well as each webpage address (i.e., URL). Data were extracted for many more observed variables beyond those proposed in the structural model as a means to: (1) descriptively explore and understand the relationship between these variables and presidential longevity, and (2) have additional data if the qualitative analyses suggested revising the theoretical model.

As the first level of analysis, the qualitative data were analyzed using the constant comparative method (Merriam, 2009; Creswell, 2014). Saturation was not reached until about the 50th observation because the content and format of each IHE website were very unique. However, as data collection continued, additional notes about presidents were recorded that might inform data analysis and discussion. The second level of analysis involved successive rounds of thematic analysis resulting in three themes: (1) data sources, (2) data quality, and (3) data collection effort. Subsequent analyses further broke

each central theme into subthemes (Table 4), which were used to describe in detail, the challenges and/or opportunities associated with obtaining a dataset derived from publicly available data.

Table 4

Themes Related to Deriving a Dataset from Publicly Available Data

Thematic Category	Subthemes
Data Sources	Types of websites Features, Navigation, and Content of IHE Websites Use of Multiple Websites
Data Quality	Absence of "Past Presidents" Page Biographical Data Interim/Acting Presidents
Data Collection Time	Time to Complete Presidential Profile Use of Multiple Search Criteria

Theme 1: Data Sources

This study aimed to create a dataset on past research university presidents who were in office on July 1, 2000, collected from trustworthy publicly accessible sources such as university websites and news coverage of events relevant to the president or his/her institution. The website addresses (referred to URL hereafter) containing the presidential item data were copied and stored as a separate item in the president's profile and later cataloged. On average, 3 URLs were stored per president. There was only one complete presidential observation with only one URL stored, meaning that all the

information was contained on one webpage. Two other observations had only one URL stored. However, a key variable (date of birth), which was needed to compute another variable (age at the time of retirement) could not be located. This issue will be discussed in greater detail in the data quality section (Theme 2).

Types of Websites

Sixty-seven percent (67%) of the data on past presidents were obtained from an IHE website (Table 5). Ranging from high to low credibility, IHE websites (URL ends with .edu) are in the medium range regarding trustworthiness (O'Leary, 2017), and have been established as a reliable source of data (Wofford, 2014). The 482 websites from which data was extracted included web pages within the president's university of interest but may also have included their former and/or next immediate institution. Institutional web pages varied from official past presidents' pages to press releases, library archives, and faculty pages.

Table 5

Summary of Websites Where Data Obtained

Domain	Examples	Count	Percentage
.edu	Official IHE webpages – e.g., Past president/chancellor page, Office of the President/Chancellor, President's Prior or Post Presidency Institution, University News/Press Release, Library Archive page, Faculty page, Curriculum Vita, etc.	482	67%
.com	National (e.g., New York Times, LA Times, Washington Post), local and	187	26%

	regional periodicals, Legacy.com, Linkedin, personal website, etc.		
.org	Foundations, religious organizations, Alumni associations, historical associations, digital encyclopedia (e.g., Wikipedia), Internet Archive Wayback Machine, etc.	41	6%
.gov	Federal and local government	4	.5%
.net	Personal website or blog	4	.5%
Total		717	100%

Although websites with the .com domain have low credibility, a good number of these sites were utilized in the data collection because they included reputable news agencies such as the New York Times, Washington Post, The Chronicle of Higher Education, Inside Higher Ed as well as respected data sources such as Bloomberg.com. When reputable .com sites were parsed out from the others and included with the counts of the .edu and .org websites, the total number of trustworthy sources from which data was extracted increased to 578 websites (81%). Websites ending in .org, followed by .gov sites added another 6.5% of credible data. Domains ending in .gov are the most reliable data sources, but .org domains have low to medium credibility. Thus, .org sites were evaluated based on the website's content and ownership (e.g., type of institution or business) and the data used with caution.

Features, Navigation, and Content of IHE Websites

The primary data source for this research was IHE websites following the hypothesis that Research 1 and Research 2 institutions are considered among the top U.S.

universities, and therefore their websites would be easy to access and contain much of the variables of interest. Thus, a more detailed analysis of IHE websites was conducted using the following criteria:

- Organization of content (e.g., textual and visual artifacts including pictures, biographical information, etc.)
- Ease of navigation (e.g., links)
- Aesthetics of website (e.g., consistent with the prestige and stature of the institution)

Figure 3 provides an example of the researcher's expectations regarding the kind of information that would be contained on the past presidents' page. The institution provided a brief bio on all past presidents. The University of Wisconsin-Madison's website, for example, was up-to-date aesthetically, and most of the variables of interest were provided on this particular page. For instance, the president's date of birth, years of service, degrees awarded, and pre- and post-presidential activities were all contained on this page. Compared to other profiles which took as long as 30 minutes to complete (discussed later under Theme 3), this profile only took 8 minutes to complete from start to finish.

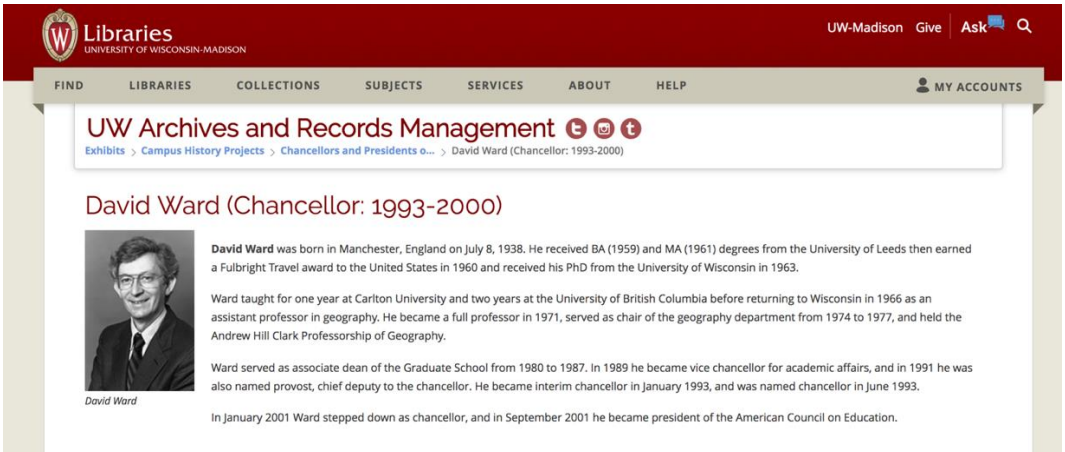


Figure 3. Image Excerpt from University of Wisconsin-Madison Website.
University of Wisconsin-Madison (n.d.). *Library page*. Retrieved from https://www.library.wisc.edu/archives/exhibits/campus-history-projects/chancellors-and-presidents-of-the-university-of-wisconsin-madison/david-ward-chancellor-1993-2000/

The screenshot of the University of Wisconsin-Madison's (UW-Madison) past president page, however, was an outlier regarding the level of detail provided about past presidents. Websites also used a variety of layouts, such as tables, timelines (Figure 4), pictures, etc., to display their presidential histories. Pages were also not always static, as some IHEs used website banners (i.e., sliders), a marketing/advertising feature, to highlight their past presidents.

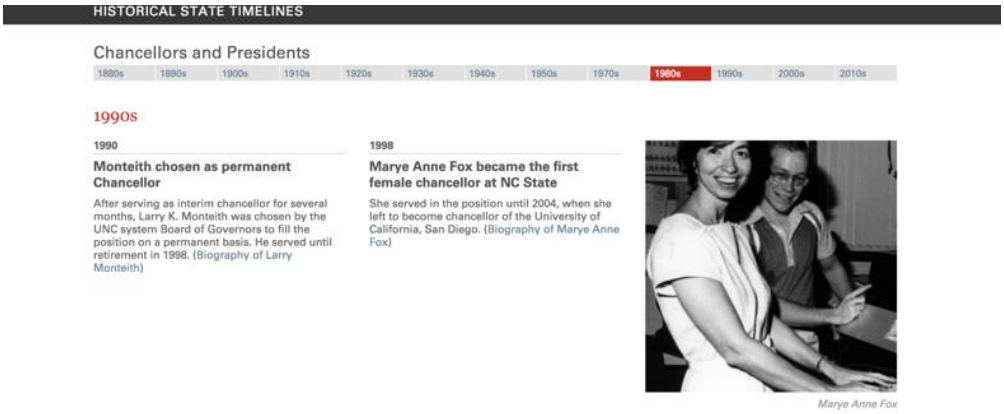


Figure 4. Image Excerpt from North Carolina State University Website. *Library Page.* North Carolina State University at Raleigh (n.d.). Retrieved from https://historicalstate.lib.ncsu.edu/timelines/chancellors-and-presidents#d1990

Although not commonly observed, a handful of websites also provided biographical information on the past president's spouse (see Figure 5).

Figure 5. Image Excerpt from Kansas State University Website. *Library page.* Kansas State University (n.d.). Retrieved from https://www.lib.k-state.edu/depts/spec/flyers/presidents.html

There were also no particular patterns with regard to the type of institution (e.g., prestigious/elite, public, university system, size, etc.). Embedded links were the most

common feature across all IHEs because they pointed to a direct biographical page, an archived page of the president's bio during their term as president, or his or her faculty or President Emeritus page (several retired presidents are currently serving their former institution in some capacity). In general, the linked data was useful. There was only one instance where a problem occurred. The institution's link to the past president linked to a digital archive. However, once the link was clicked, the president's informational link was redirected to an email stating:

> To learn more, contact the University Archives at recordsmanagement@[XXX].edu.

It is plausible that there were privacy issues with this particular president (and 3 others) because most other links on the same page produced extensive bios of the IHE's past presidents.

A link accompanied with rich description on a past president's page contributed to ease of data collection. Figure 6 is an example of a website where information was provided, but not in a very efficient format. The site displayed pictures of past presidents, but without prior knowledge of who the individuals were, it was necessary to click each photo (or at random until the president of interest was located). Each picture linked to biographical information. On this site, in particular, there was more than one picture of the same president, which made the process cumbersome because it took several guesses and scans of several bios, to locate the president of interest.

Figure 6. Image Excerpt from Nova Southeastern University Website.
Past presidents and chancellors page. Nova Southeastern University (n.d.). Retrieved from https://nsuworks.nova.edu/nsudigital_presphotos/

Many IHE websites were very clear, and most of the variables of interest could be found easily on the past presidents landing page or by navigating to other linked pages on the institution's website. At a minimum, most sites provided the president's name, a picture, their years of service, and academic background. In a few unusual cases, one institution misspelled the former president's name on their website, and a president's background information could not be located on the institution's website even though he was still a visiting professor (with an active email address) at the institution. Nevertheless, the content contained in IHE websites were of mixed quality and will be discussed next regarding the study's variables of interest and other observations.

Pre-Presidential Activities. Data collection revealed that the total number and/or title of a past president's pre-presidential positions could not be fully known. While pre-presidential positions were listed in a president's biographical information, the counts

and/or titles sometimes differed when the data was triangulated with other sources. For example, one IHE may have only included the most senior roles (e.g., Provost, Dean, etc.) in a past president's bio. Other sources providing biographical information on that same president (e.g., their previous institution) may list additional positions that were not offered by their current IHE.

On the other hand, this method of data collection also provides an opportunity to capture more detailed pre-presidential career history, which may better describe a president's readiness for the top leadership post at a research university. Honors such as Nobel Laureate, distinguished professor, endowed chair, institute directors, etc. were additional accomplishments observed regarding past presidents' pre-presidential positions. However, distinguished titles, awards, and accomplishments were not variables of interest for the quantitative analyses, thus, this level of detail was not captured in the dataset.

Immediate Prior Position. Researchers agree that IHEs are complex and this complexity further complicates research studies using IHEs as a data source or unit of analysis. One illustration of the level of complexity observed during data collection was in the sheer number of executive titles used by IHEs and consecutively held by administrators. For example, as individuals moved up the administrative ranks before their first presidency, they often held more than one executive title. A familiar titular combination seen often in the data was "Provost and Vice President of Academic Affairs." However, other administrators may only have been a Provost, or a Vice

President of Academic Affairs, or some other combination of Provost with a similar title. While each specific administrative title was individually captured in the dataset, coding for the variable *immediate prior position* required making decisions that may limit the interpretation of the findings from statistical analyses. These concerns will be described in greater detail in the findings for Research Question 2.

Post-Presidential Activities. Parsing out post-presidential activities yielded mixed results. If the president retired, moved on to another presidency or made a high profile move to lead an organization or enter political service, the information could be obtained from biographical data on the institution's site announcing the departure, or in a few cases, found on the website of the organization where they went. For instance, one institution's website did not provide much biographical information on their former president. Nonetheless, because the former president is now serving as the president of a high-profile organization, a more extensive bio could be obtained. Additionally, of the few presidents who resigned or were forced out due to scandal, their post-presidential activities were generally known because the firing or scandal was high profile and caught a lot of media attention. In many cases, the university also provided a decent bio for the past president, omitting the reason for departure, of course.

As the data collection progressed, the idea of a president "retiring" became ambiguous. For example, upon announcing his retirement, one president used the terms "stepping down" and "retiring" interchangeably and stated that he would be returning to the faculty after a brief sabbatical. Presidents who "retired" sometimes immediately

returned to the faculty or within one to three years after retiring. Some were appointed President Emeritus or assumed some other leadership role in the institution after a brief sabbatical. While these data were captured in as much detail as possible in the dataset, they also posed issues related to coding and later interpretation. These issues will be also be described under Research Question 2.

***Esteemed Presidents*.** A common trend was observed among IHEs regarding esteemed, long-serving and/or deceased presidents, which at times limited and at other times expedited data collection. It was expected that full biographical information would be available on highly adored presidents. Figure 7 is a screenshot of the bio of one of the University of Maine's longest-serving presidents. While two variables of interest are listed (e.g., dates of office and degrees), much of the president's bio pays homage to his accomplishments at the institution. This pattern of honoring esteemed presidents limited data collection because past presidents' biographical information often focused on the president's accomplishments during his or her tenure, rather than the variables of interest of this research. As a result, additional data sources were required (for this president specifically) to locate other variables of interest such as his date of birth, prior positions, post-presidency activity, etc.

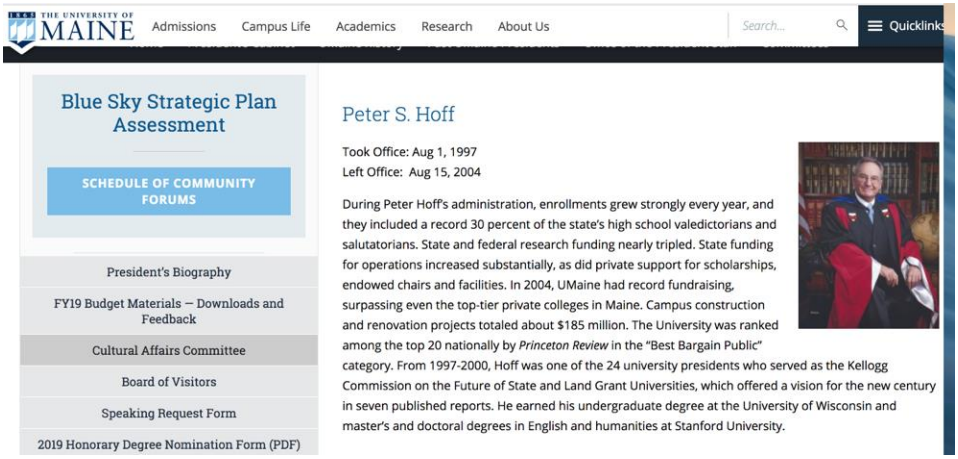


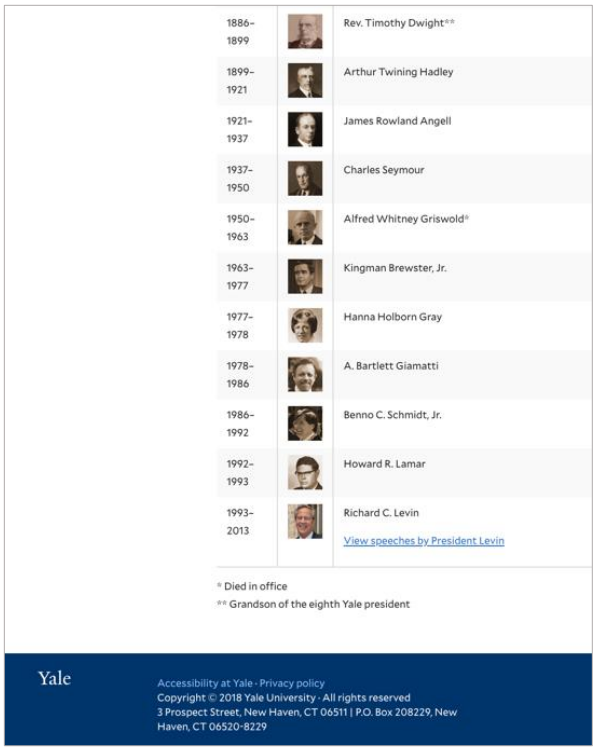
Figure 7. Image Excerpt from The University of Maine Website.
Office of the President Page. The University of Maine (n.d.). Retrieved from https://umaine.edu/president/umaine-presidents/peter-s-hoff/

On the other hand, obtaining data for all variables of interest for former presidents who were appointed President Emeritus was easier. Many presidents were still serving at their current institutions, and the institution may have provided a link to an accessible web page (via the "Office of the President" or "Past President's" pages) to a very extensive bio of the President Emeritus. For example, there was one interesting case where the president of interest was featured on an IHE's past presidents page even though the institution has had two other presidents since his presidency. However, the university's timeline on the website appears to start at 1999, the year this president's tenure began, which may be a plausible explanation since the president seen on the page is also the President Emeritus.

Similarly, ease of data collection was also observed for deceased presidents where institutions usually issued various press releases upon the former president's death and dedicated an entire page or more to honor their memory. How long these tribute pages

will be retained on IHE websites, remains to be seen as a majority of the deceased presidents' deaths occurred in the past five years.

Elite Institutions. This research held a similar expectation that the content contained on websites about past presidents for institutions regarded as "elite" or "Ivy League" would be of high quality. However, there were mixed results. For example, the Yale University past presidents page shown in Figure 8, provided names and dates for past presidents but did not have a link to biographical data on the president of interest, who interestingly served for twenty years. Instead, found on the page was a video of the chief research archivist remembering Yale's presidents through the years as well as a link to past speeches. Columbia University, another elite institution, provided names and dates, but no links to biographical data, as seen in the screenshot below (Figure 9). Several other pages within the institution's site were needed to complete the president's profile.



1886–1899		Rev. Timothy Dwight**
1899–1921		Arthur Twining Hadley
1921–1937		James Rowland Angell
1937–1950		Charles Seymour
1950–1963		Alfred Whitney Griswold*
1963–1977		Kingman Brewster, Jr.
1977–1978		Hanna Holborn Gray
1978–1986		A. Bartlett Giamatti
1986–1992		Benno C. Schmidt, Jr.
1992–1993		Howard R. Lamar
1993–2013		Richard C. Levin View speeches by President Levin

* Died in office
** Grandson of the eighth Yale president

Yale

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3 Prospect Street, New Haven, CT 06511 | P.O. Box 208229, New Haven, CT 06520-8229

Figure 8. Image Excerpt from Yale University Website.
Office of the President Page. Yale University (n.d.).
Retrieved from https://president.yale.edu/about/past-presidents

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Search & Directories
go
web people

Home
Biography
Statements and Speeches
Past Presidents
Contact Us

VISIT THE PRESIDENT'S FIVE-YEAR REPORT

Office of the President
Lee C. Bollinger

Past Presidents

President	Term of Office
George Rupp	1993-2002
Michael I. Sovern	1980-1993
William J. McGill	1970-1980
Andrew W. Cordier	1969-1970
Andrew W. Cordier (acting president)	1968-1969
Grayson Kirk	1953-1968
Dwight D. Eisenhower	1948-1953
Frank D. Fackenthal (acting president)	1945-1948
Nicholas Murray Butler	1902-1945

Figure 9. Image Excerpt from Columbia University Website.
Office of the President Page. Columbia University in the City of New York (n.d.).
Retrieved from http://www.columbia.edu/cu/president/docs/history/index.html

Religiously-Affiliated Institutions. A related pattern emerged regarding religiously-affiliated institutions. While there were only a few institutions led by priests, a common observation was that presidential bios of priests were not generally provided on the institution's website. As a result, compiling the past president's profile became difficult and time-consuming. The career history was often the most difficult, requiring several attempts using different search criteria. For example, gathering data on the career history of one president required using an entire phrase "[President full name] assumes the presidency at _____ University") to acquire the necessary information.

***University Systems*.** Another recurrent area of difficulty occurred with university systems. Capturing the correct information for the right person and institution was tricky when searching university systems with several campuses and a system president. In several instances, searching by the Carnegie classified name led to the landing page of the flagship institution, which often provided information about the system president, who may or may not have been the campus president. Another related issue was when the primary system website linked to the campus website, but the campus president was not listed (i.e., there was no "Office of the President" page).

Use of Multiple Websites

The use of multiple websites to amass the dataset on past presidents was anticipated in this research study and served as a strategy to prevent large amounts of missing data. The frequency of use of these additional data sources to supplement IHE websites was unanticipated. As highlighted in Table 5, 33% of the data were obtained

from non-IHE websites. And, as stated earlier, there was only one presidential observation requiring the use of only one website; all others needed at least some combination of an IHE website and one of the additional data sources described next. An average of three websites was required to complete a presidential profile.

Periodicals. National, regional and local periodicals such as the New York Times, and higher education affiliated publications, such as The Chronicle of Higher Education, often supplemented the information that could not be obtained from IHE websites. One criterion used to judge the credibility of these sources was whether elements of the president's biographical information reported in the news source were also published on IHE websites. One significant opportunity provided by the use of periodicals was that they often provided age-related data on presidents. Presidents' age at departure from the presidency was a critical variable of interest in this study. However, the presidents' date of birth required to compute the date of departure from the presidency variable was often hard to obtain from an IHE website. Often, media coverage of a president's appointment or retirement from the presidency listed their age. Other age-related variables were derived using the year of the article and the reported age. Theme 2 (data quality) will provide a more detailed discussion about difficulty with specific aspects of presidents' biographical history.

Nevertheless, the lack of a paid subscription was one recurrent issue with using periodicals. For example, during long periods of data collection and depending on the newspaper, attempts to access archived articles often resulted in a daily or weekly

maximum number of freely accessible materials before the publication blocked access and required a paid subscription. At times, however, the textual information contained in the search result preview was sufficient to complete the profile. At other times, launching the search using another browser (e.g., Safari instead of Google) helped to circumvent access limits.

Obituaries. Obituaries served as the next single most useful data source when the past president was deceased. Legacy.com, for example, was the most frequently encountered website for deceased IHE presidents. Obituaries generally contained the exact date of birth, presidential service dates (years at minimum) and a comprehensive educational background and career history of the former president. If the president's previous institution posted an "In memoriam" page on the former president, the text on both pages (IHE and Legacy.com) matched very closely, if not precisely.

Autobiographical Sources. Other useful data sources included personal websites and LinkedIn profiles, though rarely found during data collection. These sites helped to complete the president's education and career history. Figure 10 is the personal website of Dr. Peter Likins, former president of the University of Arizona. After coming up short on his former institution's website, a search of his name led to a very comprehensive bio, including his date of birth, to complete his profile.

Figure 10. Image Excerpt of Peter Likins Website.
Retrieved from http://www.peterlikins.com/petelikinsandloki.html

Another former president's personal site was accessed via a link from his previous institution because he is the current President Emeritus, a public speaker and continues to support the university.

Wikipedia. It is important to note that for most of the 222 institutions, Wikipedia provided a full list of all past presidents for each institution, and in more than half of the sample, active links were also provided. Wikipedia also regularly appeared as the primary search result. On several occasions, the search began with Wikipedia to locate the name of the past president because there was no available information on the institution's website. At other times, Wikipedia provided links to credible news sources such as previous institutions, periodicals such as the New York Times, or confirmatory references for essential dates of interest such as president's date of birth. For example, on

one institution's website, a list of past presidents was not available on the "Office of the President" page. However, a Wikipedia link for the president of interest that redirected back to a web archive of the presidential inauguration proved fruitful.

Wikipedia also provided useful references and links to archived documents. The Internet Archive Wayback Machine (archive.org) is a digital library that houses millions of books, movies, music, and websites. The library contains stored images of web pages in their original form before they were removed from the web. The Wayback Machine was a useful resource for several cases, providing links to archived documents (Figure 11) and websites (Figure 12) and for various institutions. Both of these resources shown above were found via links on Wikipedia.

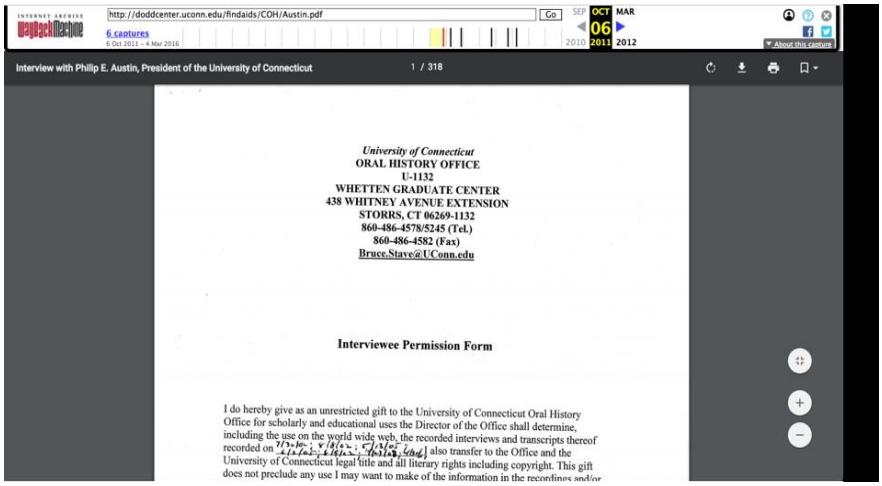

Figure 11. Image Excerpt of a Downloadable Archived Oral History Document. Internet Archive Wayback Machine (n.d.). Retrieved from https://web.archive.org/web/20111006190602/http://doddcenter.uconn.edu/findaids/COH/Austin.pdf

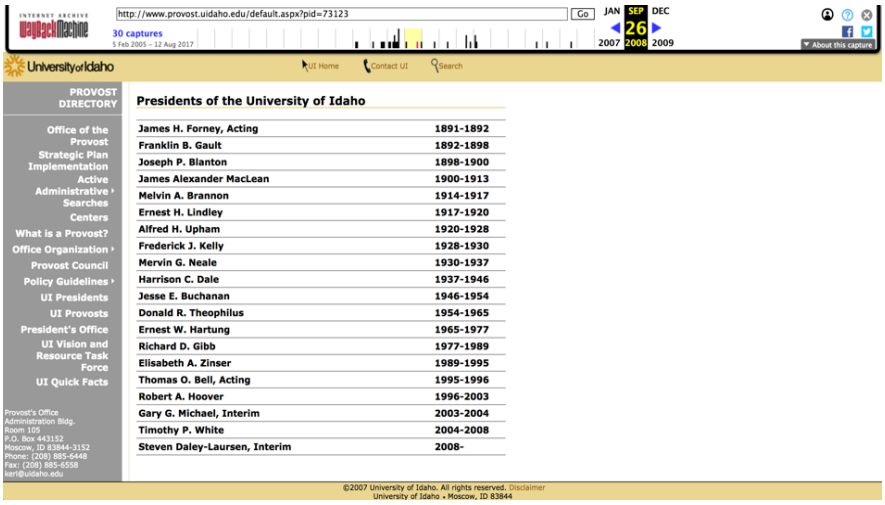

Figure 12. Image Excerpt of an Archived Webpage from the University of Idaho. Internet Archive Wayback Machine (n.d.). Retrieved from https://web.archive.org/web/20080926085437/http://www.provost.uidaho.edu/default.aspx?pid=73123

Theme 2: Data Quality

Overall, a large amount of data was obtained on past presidents from over 700 websites, specifically a combination of IHE websites and other digital resources such as periodicals, obituaries, and online encyclopedias (e.g., Wikipedia). While the content of IHE websites was of mixed quality, the overall data quality was very good as data was triangulated across various documents and websites during data collection. Nevertheless, three recurrent issues are worth highlighting regarding data quality: (a) Absence of a "Past Presidents" page, (2) incomplete biographical data, and (3) interim/acting presidents. These challenges, listed as subthemes, are described in this section.

Absence of a "Past Presidents" Page

Twenty-two (22) of the 215 research institutions (10%) under study did not have a list of past presidents. (Note: This does not include the seven institutions omitted from

the study for various reasons). If an initial search did not provide a landing page for an IHE's past presidents, then the next step was to search the "Office of the President" page and navigate from there. Sometimes, even searching the president's page led to a dead end. The lack of a detailed historical record of presidencies resulted in increased time searching through a variety of sources. For example, the lack of a page listing past presidents led to searching IHE timelines (on their website) to look for an announcement about the president of interest or using an available list in Wikipedia to begin the search In the absence of a "past presidents" page, the search engine usually returned Wikipedia (if available) as the first search result.

Incomplete Biographical Data

Presidents' academic credentials (i.e., degree), prior positions and prior institutions were among the easiest items to document. However, presidents' date of birth and start and end dates were among the most difficult variables to locate. Exact dates (day, month, year) were most elusive and posed a threat for missing data. In many cases, only the month and year was available for a president's date of birth and/or their start or departure from the presidency. The search for the date of birth became so grueling early in data collection that it would extend the search time by at least an additional three to five minutes. After about 15 observations had been recorded, it was decided to add two additional items of interest, the age when the presidency began and the age at departure from the presidency to fill in gaps where the date of birth could not be located. These two additional items had been observed in various other information sources (e.g., media

coverage of the president's hire or departure) and served as an alternative way to obtain the president's age at the time of departure if it was not known. Once this decision was made to capture any of the three variables, data collection proceeded much more smoothly and the pace per record increased.

Table 6 depicts the challenges regarding biographical data. Of the 215 presidents for which data was available, month, day and year of birth were obtained for 107 presidents, and the year was found for another 73. There were 35 observations (16%) for which date of birth could not be collected in either format. However, of the 35 observations missing this item, age at the start of the presidency was found for seven presidents and age at the end of presidency was found for another 14 presidents. Thus, the decision to capture the additional variables early in the data collection process was effective. In the final count, there were only 14 presidents for which age at the time of departure from the presidency could not be obtained (6.5% missing).

Table 6

Availability of Age-Related Data

Age-Related Data	Count	Percentage
DOB: Month/Day/Year	107	50%
DOB: Year Only	73	34%
Age at departure from the presidency	14	6.5%
Age at start of presidency	7	3%
Missing	14	6.5%
Total	215	100%

Nevertheless, problems persisted. Discrepant dates were observed at several institutions within departments. At one IHE, presidential service dates reported on the past president's page, and the institution's Office of Institutional Research (OIR) page conflicted. At another IHE, the conflicting dates appeared on the official presidential history page and the institution's Law School page where the past president held an appointment. In the event of such occurrences, the data contained in the "Past Presidents" page or "Office of the President" page was utilized above an individual department's data. On a related note, another president's start and end dates had to be approximated. Although the president was named in 1999, the actual campus over which she would preside was not constructed until about 2002. The institution's website did not provide any additional information to support exact dates.

When discrepancies regarding presidential start and end dates were observed, the best effort was made to use other archival sources such as media coverage of hire or departure to triangulate the data or resolve conflicts. Past president L. Jay Olivia (deceased), who served New York University for fifty years in various positions (and president for 11 years) is an example of how decision rules regarding discrepant dates were applied. Although the actual calendar years of service was available, obtaining exact start and end dates (month/day/year) for President Oliva proved to be very difficult. The use of various keywords such as “biography,” “date left office,” “assumed presidency” finally resulted in the best data available. Dates reported in an online book and a New York Times article that published the date the president planned to leave office were assumed to be the actual dates since no other date could be corroborated and President Olivia’s successor was not installed until months later.

Another area of difficulty regarding data quality, and specifically presidential service history, centered around the date the president took office versus his or her inaugural date. Massachusetts Institute of Technology (MIT) was the only website that provided a table listing all three dates (Figure 13). While the inaugural date was not a variable of interest, MIT’s format provided reliable data to inform about the institution’s past presidents tenure.

Office of the MIT President

- Presidential papers in the Institute Archives
- Inaugural addresses of the Presidents
- Writings by and about the Presidents

Presidents of the Institute

Name	Entered into office	Inauguration	Left office
L. Rafael Reif Webpage	July 2, 2012	September 21, 2012	
Susan Hockfield Webpage	December 6, 2004	May 6, 2005	July 2, 2012
Charles Marstiller Vest Biography	October 15, 1990	May 10, 1991	December 6, 2004
Paul Edward Gray Biography	July 1, 1980	September 26, 1980	October 15, 1990
Jerome Bert Wiesner Biography	July 1, 1971	October 7, 1971	June 30, 1980
Howard Wesley Johnson Biography	July 1, 1966	October 7, 1966	June 30, 1971
Julius Adams Stratton Biography	January 1, 1959 (see note 12)	June 15, 1959	June 30, 1966
James Rhyne Killian Biography	October 15, 1948 (see note 11)	April 2, 1949	January 1, 1959
Karl Taylor Compton Biography	July 1, 1930	June 6, 1930	October 15, 1948 (see note 10)

Figure 13. Image Excerpt of MIT's Past Presidents List.
Library archive page. Massachusetts Institute of Technology (n.d.). Retrieved from https://libraries.mit.edu/mithistory/institute/offices/office-of-the-mit-president/

The distinction highlighted with MIT's example is significant because the information listed on IHE websites or in other data sources either provided an inaugural date and the date the president took office, interchanged the date the president took office with the inaugural date, or offered only one. Sorting between multiple dates often added time to the case processing and in a few cases, may have resulted in recording an incorrect date. Nevertheless, as seen in MIT's example, the date the president took office and the inaugural dates were only a few months apart. This trend was also observed with

other IHEs and informed critical decisions surrounding dates during data cleaning and preparation for statistical analysis (discussed under Research Question 2).

Interim/Acting Presidents

While there were only four sitting interim presidents in the sample, many presidents' pre-presidential career history included interim presidencies. Also, during data collection, it was observed that some IHEs counted interim presidents' term in a president's total tenure whereas other IHEs did not. Each observation of an interim presidency, therefore, required specific action on a case by case basis. First, some interim presidents were eventually hired for the presidency. For instance, one president began her interim term on September 1999 and was officially installed as president on September 28, 2001, two years later. While the date she technically took office as president is listed, shouldn't her interim time also count toward her full tenure? In this specific case, it was decided to count the president's interim term toward her full tenure.

A second issue was whether an interim presidency at another institution, regardless of length, should count as a prior presidency. Observations while searching IHE websites revealed that not all institutions include interim/acting presidents in their official university count of presidencies. In other words, at some institutions, interim presidents were listed as the "Xth President" of the university, and at others, they were not. While interim presidencies were always listed on the "Past Presidents" page, they may not have been formally recognized in the official count, which meant that their term was excluded from the IHE's official presidential count; the calculation resumed after a

permanent president was installed. The lack of consistency around how interim presidencies were counted by IHEs (regardless of length) was critical to deciding whether an interim presidency at a prior institution should be included in a president's count of entire presidencies. Nevertheless, it was decided to include interim presidencies longer than one year in an individual's number of prior presidencies as these positions contributed to presidential experience or readiness for a permanent presidency.

Theme 3: Data Collection Time

Data were collected over sixteen non-consecutive days. As few as 3 and as many as 25 observations were recorded each day. During the first few days of data collection, copious qualitative notes were recorded about the process, extending the time to complete each profile which resulted in fewer profiles completed. Saturation was reached (i.e., no new information observed) about day nine and after about 50 observations recorded. At this point, the time to complete each profile decreased and the number of profiles completed per day increased, depending on the researcher's schedule.

Time to Complete Presidential Profile

A time log was kept for 209 observations. The original intent was to track the time using Qualtrics, however the iterative nature of the data collection process required that revisions be made to the data collection form after data collection had already begun. As a result, it was necessary to revise the content of the data captured in the first six records, which resulted in a restart of the system clock in Qualtrics. Because the time to make the quick fixes were so short and did not accurately reflect the actual time spent

capturing the data, the strategy to log total time by hand was adopted as further form corrections were anticipated along with potential revisions to presidential profiles already completed. An example of a change to a profile was finding a missing piece of data on one president as the profile for someone else was being completed. Several presidents in the sample either succeeded one another or served at the same institution at different times. Thus, by the time data had been collected on about half of the sample, there was an increased likelihood that a president for whom data had already been collected, would appear during the search for a different president.

Barring the changes to the data collection form, an average of 3.6 hours was spent each day collecting data and a total of 58 hours for the entire effort (Table 7).

Table 7

Total Data Collection Time for Sample

Time	Average/Day	Total
Minutes	217.9	3,487
Hours	3.6	58.1

Difficult cases appeared during any given day of data collection. Table 8 provides a summary of the time required to complete each record. On average, a profile could be completed within 16 minutes (regardless of institution type) and ranged from as few as 6 minutes to as long as 45 minutes for completion. Recall that IHE websites were used in combination with a variety of other kinds of websites to complete a profile.

Table 8

Minutes to Complete Profile by Institutional Control

			Range	
	n	M	Min	Max
All Presidents	209	16	6	45
Private	62	16	7	40
Public	147	16	6	45

The profile requiring 45 minutes to finish provides a good example of the challenges presented in the section on data sources (Theme 1). As data collection proceeded, it became apparent that this particular profile was not an anomaly. Recall that 22 (or 10%) of the IHEs in the sample did not have a past president's page or list of past presidents. The observation requiring 45 minutes to complete just happened to be among one of the first few in the data collection process without a past president's page. Finding the former president's name involved searching the university's digital timeline around the year 2000 to find an announcement about the president's appointment, using multiple search criteria and various websites to compile the complete profile. Strategies were developed to overcome some of the limitations inherent in using publicly available data as data collection proceeded.

The speed at which a profile or record was completed was based primarily on which search results were explored first. For example, if the search results indicated that the institution had a past president's page, then that link was investigated first, and the

process required fewer websites to complete the profile. When Wikipedia emerged as the top line in the search results, it was an indication that more effort would be needed to complete a particular record. Once this general pattern was realized, more caution was given to which links were explored first. Thus, search results were scrutinized in order of credibility (IHEs, national periodicals, etc.). There were only a handful of cases that necessitated scrolling through 3 or 4 pages of the search engine's results to complete a profile.

There was one interesting exception to this general trend. The search for one particular president's name had to begin with Wikipedia because there was no official history or timeline on the institution's website. The president's name was later found in the institution's undergraduate catalog. Overall, completing the president's profile required drilling down six pages into the Google search results to identify the president of interest, resulting in a total time of 30 minutes to complete the profile.

Use of Multiple Search Criteria

Initiating a search using "_____ University Past presidents" was often sufficient to acquire the content needed to complete a profile. In the best-case scenario, using this initial search criterion produced results that led to a "Past presidents" page, which then provided links to other pages within the institution's website that contained much of the data. If a "Past Presidents" page did not exist, the search engine results returned good links to other useful websites. With unusual cases, however, particularly when searching for post-presidency activities and/or exact departure dates, the use of

more specific search terms was required. Some of the most successful search terms included:

- President name
- President name + XXX University
- NAME + appointed (or assumes) presidency
- NAME + appointed (or assumes) + presidency at XXX University
- NAME + leaves (or retires) + presidency
- NAME + leaves (or retires) + presidency at XXX University
- NAME + prior university (if known)

Nevertheless, using a variety of search criteria yielded data on 215 of the 222 presidents of interest.

Research Question 2

To what extent can a dataset derived from publicly available data be used to test a structural model of presidential longevity in U.S. R1 and R2 universities?

The dataset extracted from digital resources were based on data availability and were not structured as planned, which presented two primary concerns for the SEM analysis: (1) sample size and (2) non-normal and categorical data. Table 9 shows the descriptive statistics for the continuous study variables. The remaining five variables were categorical and are shown in Table 10. There was missing data for appointment age and departure age, and significant variances among appointment age, departure age, and

full tenure. The categorical variables also revealed some degree of skewness with the highest degree and prior presidency variables.

Table 9

Descriptive Statistics of the Continuous Study Variables

Variable	n	M	SD	Skew	Kurtosis
Appointment Age	192	53.25	5.07	-.09	-.22
Departure Age	192	64.79	5.62	-.30	.38
Full Tenure	202	11.62	5.64	.78	.74
Prior Presidencies	202	0.46	0.72	1.80	3.82

Note. The variation in sample size is due to missing values for ten presidents.

Table 10

Descriptive Statistics of the Categorical Study Variables

	Frequency	Relative Frequency
Academic Degree		
PhD	168	.83
JD	25	.12
Other	9	.04
Academic Discipline		
Social Science and Business	51	.25
Science and Mathematics	42	.21
Humanities, Religion, Arts	42	.21
Law	33	.16
Engineering	22	.11
Education	10	.05
Other	2	.01

Highest Prior Position		
President/Chancellor	53	.26
Interim President/Chancellor	22	.11
Senior H.E. Officer	79	.39
Dean	30	.15
Department Chair/Faculty/Unknown	18	.09
Internal/External Hire		
External	153	.76
Internal	49	.24
Post-Presidency Activity		
Retired	78	.39
Other employment	56	.28
Assumed faculty position	35	.17
Assumed another presidency	33	.16

Because sample size and normality assumptions are central to SEM, it was necessary to address these concerns before testing the structural model on presidential longevity by employing many of the common strategies used by scholars, namely data imputation, variable transformation, and model revision. However, some of the solutions utilized were still insufficient to overcome some of the technical issues encountered with estimating the model. These limitations will be discussed throughout this section and under Research Question 3.

Data Imputation

Structural equation modeling is described as a large sample technique. Although analyses utilizing sample sizes between 100 to 200 observations are reasonable, a large sample of at least 200 is recommended (Kline, 2011). Sample size concerns were

compounded by the fact that five of the nine observed variables were non-normal and categorical and would, therefore, require an alternative estimation method beyond the normal theory maximum likelihood estimator (Finney & DiStefano, 2006; Kline, 2011). While robust estimators, such as the WLS (discussed in Chapter III) have been developed to analyze non-normal and ordered-categorical data and incorporated into popular SEM software, scholars have encountered technical difficulties employing these estimation methods, even with sample sizes as large as 1000 (Kline, 2011).

Of the initial 215 profiles captured in the overall dataset, 94% of the sample were past presidents. However, further examination of the data revealed missing observations among two primary indicators, appointment age, and departure age as well as with one record missing more than 75% of the variables of interest. This record was subsequently omitted from the dataset before analysis. The missing data on presidents' appointment age and departure age were related to the absence of the president's date of birth. Without dates of birth, these variables could not be computed. And, omitting these cases was not feasible because it meant working with a sample size below the suggested minimum of 200 cases. Therefore, the missing variables were imputed using the MCMC algorithm available in LISREL to obtain a final sample size of 202 past presidents.

Variable Transformation

Another characteristic feature of SEM is that the estimators used to generate parameter estimates and fit indices are typically based on normal theory assumptions of multivariate normality and continuous data (Finney & DiStefano, 2006). Non-normal and

categorical data violate the assumptions of the standard estimators used in SEM and violation of these conditions can lead to biased parameter estimates and model fit, which can impact decisions about the theory being investigated (Kline, 2011). Additionally, non-normal and categorical data, coupled with sampling variation issues, can also contribute to technical difficulties such as nonpositive definiteness during WLS estimation (Kline, 2011; Wothke, 1993). A positive definite data matrix is required for most SEM estimation methods. Nonpositive definiteness can be caused by extreme bivariate collinearity or multicollinearity ($r > .95$); zero, near zero or negative eigenvalues; negative error variances; and polychoric correlations (Kline 2011; Wothke, 1993). The issue of nonpositive definiteness became a recurring problem during the analysis, which will be discussed in greater detail under Research Question 3.

Education data is typically expressed as categorical data (Kline, 2011) and this study was no exception. All the observed exogenous variables and one of the observed endogenous variables required to test the structural model were categorical, and several had a non-normal distribution. Researchers agree that ordered categorical variables (i.e., ordinal variables) can often be treated like continuous indicators when they possess a minimum of five ordered categories and the distribution is approximately normal (Bollen, 1989; Finney & DiStefano, 2006). However, re-coding categorical variables in this study proved difficult in some instances. For example, the academic discipline variable could not be re-coded as an ordinal variable because it was indeed a nominal variable. There was no literature to support ordering presidents' academic disciplines regarding their

importance to lead a research university or about presidential longevity. Thus, dichotomous dummy variables were created for each discipline, which would then be included in the model as individual exogenous variables, rather than a single discipline variable. However, when the analysis was attempted using the dummy variables, LISREL produced a warning that the asymptotic covariance matrix was not positive definite and provided an improper solution. As a result, it was determined that the most meaningful way to code the discipline variable for this study was as a dichotomous variable depicting STEM disciplines (science, technology, engineering, math) versus non-STEM fields of study (e.g., humanities, law, business, social science, education, etc).

Another categorical variable that proved difficult throughout the analysis was the degree variable. For example, 83% of past presidents held a Ph.D., and another 12% held a Juris Doctorate (Table 10). The other 5% of presidents held master's degrees, and one president held a bachelor's degree. The variable was recoded as a dichotomous continuous variable for simplicity. If a subject held a Ph.D., they were coded 1, otherwise 0.

Furthermore, where possible, ordered categorical variables were coded as ordinal data to normalize the distribution. For example, senior higher education officers typically held more than one title at a time, resulting in numerous categories to describe the indicator, prior position. As a result, the dataset was recoded to capture the former president's highest prior position, which was then ordered from highest ranking to lowest ranking. For instance, if the highest position held was president, a rank of 5 was assigned

to the variable, prior position. (For ease of interpretation and to mitigate small subgroups, system president and president of a single institution were consolidated into one category). Interim presidents were assigned a rank of 4, senior higher education officers (e.g., provost, vice president, etc.) received a rank of 3, and deans were ranked 2. Levels below dean (e.g., department chair, faculty) received a rank of 1.

A similar approach was used for the post-presidency indicator. Hypothetically, if the president moved on to another presidency, their willingness to continue in the presidency was an indicator of presidential longevity (albeit at another institution). Furthermore, if an individual assumed another presidency after their term ended, they received a score of 4. Determining the order of the next three levels (after assuming another presidency), however, was somewhat difficult as there is limited research on post-presidential activity in the literature. Cohen and March (1974) described the presidency as the culmination of one's career and the reward of a good career. Therefore, it is reasonable to assume that the president more than likely desires to succeed in this role and leave their mark on the institution, which may take some time. As a result, the president may view retirement from the presidency (rather than early dismissal) as a reward for their service. Thus, a return to the faculty or retirement would be more favorable than having to seek other employment. Additionally, some presidents often return to the faculty after retiring from the presidency (Langbert, 2012; Reed, 2002). This trend was observed during data collection where many presidents took a one- or two-year

sabbatical then returned to a faculty position. As a result, a return to the faculty received a score of 3, retired a score of 2 and other employment a score of 1.

Model Revision

The final strategy used in this research to address the non-normal and categorical data issues was to revise the model. This study aimed to introduce and use structural equation modeling with a dataset of Research 1 and Research 2 university presidents, to incorporate relevant variables and operationalize theoretically meaningful latent constructs to evaluate a structural model of presidential longevity. The original model included two exogenous latent variables (presidential motivation and presidential readiness), one mediating endogenous variable (institutional commitment), and an endogenous dependent variable (presidential longevity). In the original model, presidential motivation was hypothesized to influence presidents' academic background (e.g., highest degree earned, academic discipline), and presidential readiness related to the pre-presidential career track (e.g., academic or administrative path to the presidency, internal/external hire, etc.). Measures of the endogenous latent dependent variable, presidential longevity, included presidents' full tenure, the president's age when they leave the presidency and their post-presidency activity (e.g., retirement). The mediating endogenous variable institutional commitment described the president's fit with their institution, in terms of selectivity, prestige, wealth, and student performance. Before this study, the research on the relationships among these variables were typically predictive analyses, which did not account for measurement error in the observed variables. This

study reasoned that by utilizing SEM, substantive theories of presidential longevity could be quantified and tested using hypothesized causal paths while handling measurement error.

The mixed methods design of this study left open the possibility that the theoretical model of presidential longevity would need revision before the SEM analysis, and both the data collection process and data structure confirmed the need for model revision. First, the latent mediating construct, institutional commitment, suggested the need for a growth model, rather than the proposed structural regression model. This growth model is necessary because when presidents arrive at an IHE, their level of commitment to the institution is expected to be demonstrated by their attention to key measures of the IHE's growth (e.g., financial management, enrollment management, and fundraising) (Gagliardi et al., 2017; Muller, 1994). Therefore, capturing the institutional commitment indicators at one point in time (i.e., July 1, 2000) would not properly represent the president's impact on these key measures. As described earlier under RQ1 (Theme 1), many of the IHE websites and documents were filled with commendations to long-term presidents for their significant impact on the institution's growth, such as increased student enrollment, increased funding for research and new facilities. As such, a more accurate representation of a president's commitment to the institution would be to measure IHE growth indicators at the president's time of appointment to the presidency, midway through his/her presidency and again at their departure from the presidency. However, the level of effort required to acquire data on R1 and R2 presidents at two or

three time points would have been very time intensive and beyond the scope of this study. As a result, the intervening latent construct was omitted from the original structural model. Figure 14 depicts the revised model.

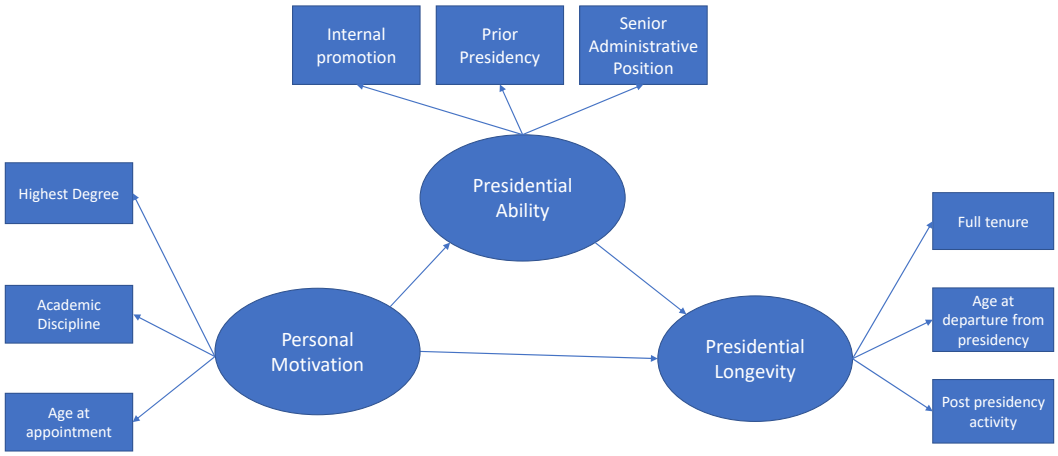

Figure 14. Revised Structural Model of Presidential Longevity

Another revision to the model concerned the measures of personal motivation and presidential ability. First, the factor of personal motivation was restructured because it only had two indicators. While a minimum of two indicators is possible for a model with two or more factors (Kline, 2011), model identification and the homogeneity found in the degree indicator discussed earlier presented concerns. Additionally, the indicator, president's age at appointment was added to the model as a measure of personal motivation in order to test the theory that the presidency represents the capstone to one's academic career (Cohen & March, 1974); in other words, the notion that the presidency is a precursor to retirement.

Second, the presidential readiness factor was relabeled presidential ability and restructured. Both the literature (McDonald, 2012) and observations during the data collection process precipitated these changes. Within universities, the administrative pathway begins at the rank of the dean (Borwick, 2013) and Reed (2002) described the academic pathway as faculty service up to Academic Vice President. Regardless of which definition is used, a closer examination of the final dataset revealed that 95% of presidents in the sample held the rank of Dean or higher before becoming president of the IHE under study, and equally as many served the faculty. Similar findings were also reported by Birnbaum and Umbach (2001). This observation in the dataset suggested that whether a president followed an administrative versus academic track was no longer a meaningful variable to discriminate among presidents in this sample. It also meant that an important element of the theory was missing. Thus, the number of prior presidencies was included as an indicator of the degree of administrative experience on the pathway to the presidency. The rationale for this substitution stemmed from the literature suggesting a trend among public university presidents to assume multiple presidencies (Monks, 2012; Reed, 2002). It is reasonable to believe that with each presidency more administrative experience is gained, thereby increasing presidential ability and longevity. Also, because the prior presidency indicator was a bit skewed (1.80) and kurtotic (3.82) (Table 9), the variable was treated as a dichotomous variable where a score of 1 was assigned if a president was previously a university president on any level (e.g., system, single

institution or interim) and 0 if no prior presidential experience, in order to make the variable more stable during estimation.

In summary, the data collection process generated an adequate sample size of 202 former presidents to test the structural model of presidential longevity, but the limited variation in the dataset and the structure of the data resulted in a tenuous SEM analysis. Many of the variables of interest were categorical and/or possessed non-normal distributions, necessitating the use of similar strategies and solutions used by other scholars in the literature. Still, technical difficulties persisted during model estimation, specifically the issue of nonpositive definite matrices. These technical difficulties are described in greater detail under Research Question 3, which presents the results from the SEM analysis.

Research Question 3

Given a dataset derived from publicly available data, what structural model best supports the theory of presidential longevity in U.S. R1 and R2 universities?

The two-step rule (Bollen, 1989) was used to guide analysis of the structural model: (1) re-specify the structural model as a confirmatory factor measurement model to determine whether it fits the data, and (2) if the CFA fits the data, then analyze the structural model. If the CFA does not fit the data well, then it should be re-specified and re-tested. The CFA was a three-factor model with three measures of personal motivation (academic degree, academic discipline and age at appointment), three measures of presidential ability (internal/external hire, highest academic position, previous

presidencies) as well as three measures of presidential longevity (age at departure from the presidency, full tenure, and post-presidency activity). The raw data containing continuous and ordered categorical variables were submitted to LISREL 9.30 (Student), which produced the polychoric correlation matrix and asymptotic covariance matrix. The three-factor model was analyzed using Weighted Least Squares (WLS) estimation.

As stated earlier, the dummy variables for discipline were included in the model as individual exogenous variables, but LISREL could not properly analyze the model this way. The software kept producing zero values for the parameter estimates because the asymptotic covariance matrix was not positive definite. Efforts were made to troubleshoot the problem by alternating the reference variable in the dataset to tease out which discipline might be causing the problem, but the results remained the same.

Next, the model was tested with the dichotomous discipline variable (STEM/non-STEM). The fit indices suggested that the three-factor model did not fit the data. However, more importantly, the output warned that the input matrix to be analyzed (the asymptotic weight matrix) was not positive definite. Wothke (1993) suggested that this type of warning points to a problem with the polychoric correlations and that if this were the case, a good solution for this problem might not exist (E. Rigdon webpage, www2.gsu.edu/~mkteer/ndpmatri.html). There were also warnings that the Phi and Theta-Delta matrices were not positive definite. Based on these results, the motivation factor was eliminated from the model under the assumption that the collinearity between the discipline and degree variables was causing the nonpositive definiteness with the

input matrices. The structural model was re-specified and examined as a two-factor model, beginning with the measurement model. As speculated, the warnings regarding nonpositive definiteness of the input matrices did not occur once the motivation factor was removed from the model.

Measurement Model

The two-factor CFA fit the data well. The chi-square test of model fit ($\mathcal{X}_M^2(8)$ = 6.95, p = .54), the *RMSEA* = 0.0, with the upper bound of the 90% confidence interval at 0.08, which is less than the recommended <0.1 (Kline, 2011), and the *CFI* = 1.0, above the recommend 0.95 value for excellent fit (Kline, 2011). However, the *SRMR* = 0.12, which is higher than the recommended .08 threshold (Kline, 2011).

Table 11 provides the parameters estimates for the CFA. The unstandardized factor loadings were statistically significant (p < .05) for two measures of presidential ability; prior presidency was not tested for statistical significance. Highest prior position loaded well onto the factor, presidential ability, and in the direction expected (2.49). However, internal/external hire loaded very low (-0.191) on presidential ability. Unfortunately, the measures of presidential longevity were not statistically significant; this was an unexpected result. (Note: Post-presidency activities was not tested for statistical significance.) Full tenure loaded well onto presidential longevity and in the direction expected (-1.398). Departure age loaded in the direction expected (-.775), but it did not have as strong a loading as expected. Additionally, the error variance for the highest academic position was negative (-0.983). This negative error variance represents a

Heywood case (Kline, 2011) which prompted a warning from LISREL that the Theta-Delta matrix was not positive definite. As stated earlier, positive definite warnings can be related to sample size, non-normal data or a misspecified measurement model (Kline, 2011; Wothke, 1993).

Table 11

Weighted Least Squares Estimates for a Two-Factor Model of Presidential Longevity

Parameter	Unstandardized	SE	Standardized
	Factor Loadings		
Presidential Ability Factor			
Prior Presidency	1.000[a]	—	.566
Internal/External Hire	-.191*	.070	-.108
Highest Prior Position	2.490*	.697	1.408
Presidential Longevity Factor			
Post-Presidency Activity	1.000[a]	—	.357
Full Tenure	-1.398	.723	-.499
Departure Age	-.775	.466	-.277
	Measurement error variances		
Prior Presidency	.680*	.132	.680
Internal/External Hire	.988*	.071	.988
Highest Prior Position	-.983	.729	-.983
Post-Presidency Activity	.873*	.105	.873
Full Tenure	.751*	.174	.751
Departure Age	.924*	.098	.924
	Factor variances and covariances		
Presidential Ability	.320*	.111	1.000
Presidential Longevity	.127	.078	1.000
Ability ↔ Longevity	.066	.041	.326

[a]Not tested for statistical significance. *Unstandardized estimates are statistically significant at $p < .05$.

Other areas of concern was measurement error and the proportion of variance explained by the constructs. There was a negative error variance for the highest prior position (-.983), and the presidential ability factor only accounted for 2% of the variance in the internal/external hire measure. The CFA model is expected to explain more than 50% of the variance for each of the indicators (Kline, 2011). The presidential ability factor did account for 54% of the variance in the prior presidency indicator.

Full Model

The full structural model presented in Figure 15 was analyzed using LISREL 9.30 (Student). LISREL produced a converged and admissible solution.

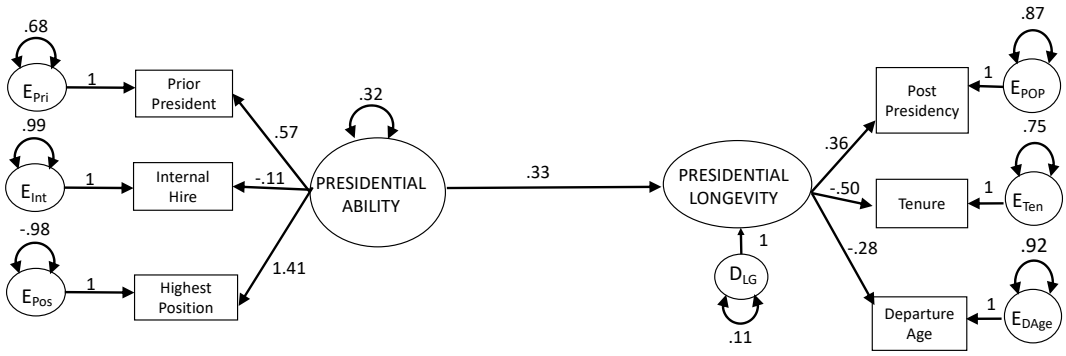

Figure 15. Standardized Structural Regression Model of Presidential Longevity

The full model fit the data well. The chi-square test of model fit ($\mathcal{X}_M^2(8) = 6.95$, p = .54), the *RMSEA* = 0.0, with the upper bound of the 90% confidence interval at 0.08, which is less than the recommended <0.1 (Kline, 2011), and the *CFI* = 1.0, above the recommend 0.95 value for excellent fit (Kline, 2011). However, the *SRMR* = 0.12, which is higher than the recommended .08 threshold (Kline, 2011).

Table 12

Weighted Least Squared Estimates for Factors of Presidential Longevity

Parameter	Unstandardized	SE	Standardized
Presidential Ability → Presidential Longevity	.206	.107	.326

*Unstandardized estimates are statistically significant at $p < .05$.

The unstandardized parameter estimates for measures of presidential ability were statistically significant at $p < .05$; however, the indicators for presidential longevity were not statistically significant. Also, while the relationships between the factors were positive (Table 12), the strength of the path between the constructs was weak and not statistically significant (.206). The weak path between presidential ability and presidential longevity was an unexpected finding. It is possible that the results could be strengthened with more power or a larger sample size (Kline, 2011).

Overall, the two-factor structural model (Figure 15) did not provide any evidence to support theories of presidential longevity. The measures of presidential longevity were not statistically significant, and the path between presidential ability and longevity, though positive, was weak and not statistically significant. On the other hand, the measurement model does provide some evidence to support prior research. For example, senior higher education administrative leadership and prior presidencies were statistically significant indicators with positive loadings on presidential ability. Highest prior position had the strongest loading on the presidential ability factor (1.408), compared to

internal/external hire (-.11) and prior presidency (.566), which did not load as high as expected. This finding suggests that individuals who possess high presidential ability are likely to have senior level higher education experience and/or previously served as a chief executive as an IHE (Birnbaum & Umbach, 2001; McNaughtan, 2016). Whether the president is an internal/external hire does not factor into presidential ability.

Measures of presidential longevity were not statistically significant and as high as expected. Full tenure had the highest loading on presidential longevity (-.499), compared to post-presidency activity (.357) and age at departure (-.277). Yet, the negative paths between the indicators and the construct gives credence to trends observed in the literature among public university presidents (Monks, 2012; Padilla & Ghosh, 2000; Reed, 2002), specifically that individuals with high presidential longevity are likely to have shorter presidential tenures and leave the presidency at a younger age. Or, put another way, presidents, who are likely to assume another presidency are usually younger and have had a shorter-term presidency (McNaughtan, 2016).

In summary, the dataset derived from publicly available data did not fit the three-factor structural model and was hindered by nonpositive definite matrices, presumed to be affected by the number of categorical variables and sample size. While removing the personal motivation factor from the model resulted in a better fitting model, Heywood cases persisted, suggesting model misspecification. The challenges encountered with the nonpositive definite matrices and Heywood cases calls SEM analysis into question for this line of research. Nevertheless, SEM is a family of statistical models (e.g., path

diagram, CFA and structural regression models) and it is plausible that the analysis could work given more power or with another SEM approach such as path diagrams. Prior studies using SEM in higher education research used very large samples (Johnsrud & Rosser, 2002) and path diagrams (Pascarella & Terenzini, 1983).

Research Question 4

To what extent do the factors that influence presidential longevity differ among presidents of public and private R1 and R2 universities?

The two-factor structural model fit the dataset derived from publicly available data well, and the relationship between the presidential ability and presidential longevity was positive, although weak and not statistically significant. The measurement model also provided some statistically significant evidence to support prior research about measures of presidential ability, particularly highest prior position and prior presidency. Additionally, the measures of presidential longevity, although not statistically significant, did load onto the factor in the direction expected. This section describes differences between public and private research university presidents on the measures of presidential ability and presidential longevity using descriptive statistics provided in Tables 13 and 14.

Presidential Ability

Table 13 presents descriptive statistics for indicators of presidential ability by institutional control. Approximately 77% of private university presidents and 75% of public university presidents were external to their institution when they assumed the

presidency and many presidents in the sample were first-time presidents. However, a more substantial proportion of public university presidents (39.2%) had previously held at least one presidency, compared to 26.7% of private university presidents. Prior presidencies included system president/chancellor, president/chancellor of a single institution or interim president/chancellor. Interestingly, one public university president previously held as many as four presidencies before his appointment to the IHE of interest.

Table 13

Indicators of Presidential Ability by Institutional Control

	Control	
Characteristics	Private not-for-profit (*n*=60)	Public (*n*=143)
	%	%
Ascension to the Presidency		
External	76.7	74.8
Internal	23.3	25.2
Prior Presidencies		
0	73.3	60.8
1	16.7	32.2
2	8.3	4.9
3	1.7	1.4
4		0.7

Highest Prior Position		
President/Chancellor	25	26.6
Interim President/Chancellor	5	13.3
Senior H.E. Officer	30	42
Dean	21.7	11.9
Department Chair/Faculty	13.4	2.1
None/Unknown	5	4.2

Public IHE presidents on average entered the presidency with higher levels of administrative experience. Compared to private IHE presidents (30%), 42% of public IHE presidents held a senior higher education officer title (e.g., Provost, EVP, etc.) before assuming the presidency. Interestingly, 13.4% to 18% of former private IHE presidents assumed presidential leadership with prior experience below the rank of dean or no administrative experience at all, compared to 6.2% for public IHE presidents.

Presidential Longevity

Table 14 describes measures of presidential longevity by institutional control. On average, presidents who were in office on July 1, 2000, assumed leadership at their IHE in their early fifties. Private university presidents were 52.3 years of age, whereas public IHE presidents were slightly older at 53.7 years of age. There were also small differences between private university presidents and public university presidents' full tenure. Average tenure was marginally higher for presidents at private universities, 12.5 years, compared to 11.3 years for presidents who led public universities. The shortest tenure among both groups was two years, and at public IHEs, the longest presidency was 35

years. Among private IHEs, the longest presidency was 26 years. Both groups of presidents, on average, departed their IHE before their 65th birthday.

Public and private university presidents primarily retired after the presidency; however, 21% of public university presidents were more likely to assume another presidency (after their presidency of interest) compared to 5% of private university presidents. Private IHE presidents were more likely to seek other employment outside the university or at another institution (33.3%) or return to the faculty after retirement (21.7%), compared to public university presidents (25.2% and 15.4% respectively).

Table 14

Indicators of Presidential Longevity by Institutional Control

	Control	
Characteristics	Private not-for-profit (*n*=60)	Public (*n*=143)
	M	M
Age at Departure	64.6	64.9
Full Tenure	12.5	11.3
	%	%
Post-Presidency Activity		
Assumed another presidency	5	21
Assumed faculty position	21.7	15.4
Retired	38.3	38.5
Other employment	33.3	25.2
Died in office	1.7	–

Chapter Summary

This chapter presented the study's findings, organized by research questions. Overall, the data collection process produced good quality data to conduct the SEM analysis. The dataset, however, was limited to what was available on IHE websites and other digital sources, and much of the data were categorical, requiring variable transformation and model revision. These limitations resulted in a simplified model that eventually fit the data but brought into the question the use of SEM for this line of research. Nevertheless, the analysis did produce some evidence to support prior research findings regarding measures of presidential ability and presidential longevity.

CHAPTER V

DISCUSSION, LIMITATIONS, FUTURE RESEARCH AND CONCLUSIONS

Scholarship on presidential tenure and turnover claim that long-term presidencies in U.S. colleges and universities have been declining for decades. Despite these claims, there is still limited understanding of the reasons for this decline. Prior research designs focused on survey methodology and quantitative statistical techniques. While the methods used to support research on presidential tenure and longevity has advanced in recent years, most studies have acknowledged weaknesses in instrumentation and sampling, and the definition of presidential tenure has been inconsistent. This study used a convergent mixed methods design to create a large dataset (n=202) from publicly available data to test a structural model of presidential longevity using structural equation modeling.

Four research questions guided this study:

RQ1: What are the challenges and/or opportunities associated with obtaining a dataset derived from publicly available data to conduct advanced statistical analyses?

RQ2: To what extent can a dataset derived from publicly available data be used to test a structural model of presidential longevity in U.S. R1 and R2 universities?

RQ3: Given a dataset derived from publicly available data, what structural model best supports the theory of presidential longevity in U.S. R1 and R2 universities?

RQ4: To what extent do the factors that influence presidential longevity differ among presidents of public and private R1 and R2 universities?

Chapter V begins with a summary and discussion of key findings and the implications of these finding. Next, the limitations of the study are discussed. The chapter concludes with recommendations for future research and conclusions drawn from this study.

Discussion of Key Findings

This study's strength was in its research design. This study utilized a convergent mixed methods design to explore presidential longevity and tenure. The data collection process generated a rich descriptive dataset on former research university presidents spanning five decades, which was then used to quantify relevant measures previously explored in the literature to test a structural model. The study provides similar conclusions to the existing literature about the measures of presidential ability and presidential longevity and presidents' characteristics. However, different conclusions were drawn regarding the feasibility of this methodology with R1 and R2 presidents, the importance of using full tenure as a measure of presidential longevity, and about the tenure and turnover trends of research university presidents.

Publicly Available Data

Prior research on presidential tenure and longevity relied primarily on surveys and quantitative techniques. By design, IHE websites served as the primary data source for this study because it was assumed that these sites would have the most accurate information on former presidents (O'Leary, 2017; Wofford, 2014) and that this data would contain information about presidents' full tenure and post-presidency activities, key measures of presidential longevity. Full tenure and post-presidency activities are not obtainable from surveys of sitting presidents. Measures of personal motivation, presidential ability, and presidential longevity were obtained from IHE websites, and other data sources for 97% of the 222 R1 and R2 IHEs sampled. While the data collection process was time intensive and required the use of numerous and diverse types of websites, much was learned about the content of IHE websites, the quality of data available on the internet, and the breadth of data sources available to research university presidents.

Surprisingly, Wikipedia turned out to be a reliable source for this type of research. Wikipedia is generally regarded as a non-trustworthy source for research. However, that was not the case in this study. When IHE websites were limited regarding presidential histories, Wikipedia became a good starting point to identify past presidents' names and biographical information, as well as to track down additional sources and archival data. The content extracted from Wikipedia could be triangulated with other independent data sources and confirmed.

Overall, the opportunities realized from building a dataset by searching websites for content on past presidents far outweighed the challenges. While the process was time intensive (e.g., 58 hours to acquire data on 215 presidents), it is doubtful that the amount of data contained in the dataset on such a large sample could be easily obtained from a survey of former presidents in such a short timeframe. For example, a survey capturing the same amount of detailed information contained in this dataset would take longer than 15 minutes to complete, threatening the response rate and sample size for a population that is already considered hard to reach. Additionally, the time required to locate the names and contact information of former presidents (e.g., searching IHE websites), distribute surveys and follow-up with participants would require significantly more than the effort used in this study.

The data collection process therefore, makes a methodological contribution to the literature. Extracting data by hand from IHE websites and other sources proved to be a valid and unconventional alternative to surveys on presidents and show promise for future studies on university presidents. Given the lack of consistency across IHE websites, the success of this methodology highlights the limitations of advanced data collection techniques such as web scraping, which only work well on websites that have a common underlying structure.

Structural Equation Modeling

The SEM analysis was difficult with this particular dataset. The categorical nature of the data, a feature common to education data, prompted several instances of nonpositive definiteness related to input matrices and negative error variances. Overall,

the SEM analysis worked, but only after reducing the number of categorical variables and reducing the model to a two-factor model instead of a three-factor model. The technical difficulties with the analysis suggest that SEM analysis may be more successful in higher education studies with non-normal and categorical data when the sample size is large (n > 500 or 1000). SEM had been used to understand student persistence (Pascarella & Terenzini, 1983; Nora, 1987) and faculty intent to leave their IHE (Johnsrud & Rosser, 2002) using continuous data and larger samples. SEM is a family of models, so when the dataset is mostly categorical and smaller, preliminary analysis may be necessary before choosing and testing structural models. Benson (1998) recommends an exploratory factor analysis before a CFA to establish strong construct validity evidence.

Factors Associated with Presidential Longevity

This study confirmed that research university presidents are a homogenous group (Mueller, 1994; Padilla & Ghosh, 2000) regarding personal characteristics and academic background and provides additional evidence to support claims regarding public university presidents' multiple presidencies (Monks, 2012; Reed, 2002). Eighty-three percent of former presidents in the sample held a Ph.D. degree, and 91% took an administrative pathway to the presidency (Gagliardi et al., 2017). The rigor of the qualitative data collection process, which spanned five decades of research university leadership, updates the literature and adds depth to what is currently known about presidents' tenure (Padilla & Gosh, 2000; Gagliardi et al., 2017) and post-presidency activities (Monks, 2012; Reed, 2002).

Past research has been inconsistent in defining presidential tenure, and only Padilla and Ghosh (2000) and Röbken (2007) have used the full tenure measure. Röbken's longitudinal analysis found that full tenure produces the highest average estimates of presidential tenure. Capturing past presidents' full tenure in this study, rather than completed tenure, updates the literature and makes a methodological contribution because the findings demonstrate that tenure among research university presidents is not on the decline. Use of completed tenure grossly underestimates actual presidential service. For example, average tenure reported for presidents of doctoral granting IHEs based on completed tenure (i.e., years to date in present job) was 7.6 years in 2006 and 6.6 years in 2016 (Gagliardi et al., 2017). In 1986, average completed tenure was reported at 6.1 years (American Council on Education, 2007). This study found that in reality, presidents who were in office on July 1, 2000 had an average tenure of 11.6 years, 4 years longer than the completed years reported. This is a significant finding because it sheds a better light on our understanding of presidential longevity and reverses the current narrative about declining presidential tenure in higher education. It appears that presidents are fully equipped and willing to stay as long as they are needed to effect institutional change and meet the heightened demands of students and families.

Limitations of the Study

There are several limitations to this study. First, this study's SEM results are only generalizable to research universities and not all institutions of higher education. Research university presidents may share similar personal and professional characteristics than to presidents of community colleges or liberal arts IHEs.

Second, the structural model was theoretically derived. The selection and operationalization of the constructs were constrained by the data and the data collection strategy and thus, may not fully represent the characteristics of research university presidents concerning presidential longevity. Presidents and their respective universities are very complex, and any number of salient variables can be used to describe them (Johnsrud & Rosser, 2002). This study employed the most frequently investigated indicators in the literature that were publicly available to describe research university presidents and indicators of presidential longevity.

Third, structural equation modeling requires a large sample size, especially for use with categorical variables. If a large sample size is not feasible with higher education data or publicly available, then a different SEM model, statistical analytic approach, or data collection method should be considered.

Lastly, results from this study cannot and should not be used to draw conclusions about presidents' success or satisfaction in their role as president (Reed, 2002). Similarly, the findings in this study are meant to inform the kinds of data that are publicly accessible, where these data are located and the strengths and weaknesses of using data from these sources regarding this study's research questions. The findings should not be interpreted as a summative evaluation of the data sources mentioned in this study (e.g., IHE, periodicals, etc.).

Recommendations for Future Research

This study laid a foundation for future research using alternate data collection and advanced quantitative methods, and to gain deeper insight into presidential longevity in

higher education. One area of future research is theory refinement. The hypothesized structural model did not fit the data well because the theorized relationships between the constructs and indicators were misspecified and the presence of categorical data confounded the analysis in many ways. While this study used salient variables of interest that were available on public websites, it is possible there are other relevant variables that were not considered and included in the model or data collection effort. Additionally, it is possible that there are corresponding datasets to the data available on IHE websites and other sources that were unknown to the researcher. For example, the one area left unexplored in this study regarded the interaction between presidents' characteristics and institutional characteristics on presidential longevity. This study intended to use IPEDs to gather data on institutional characteristics.

Additionally, a closer examination of presidents' commitment to the IHE, as demonstrated by gains in student enrollment, research and facilities expenditures, and fundraising efforts pointed to the need for an alternative methodology such as growth modeling to fully explore the construct of institutional commitment. However, the data collection effort required to pursue this line of research was beyond the researcher's capacity and scope of this study. Thus, the focus of this study was limited to examining presidents' personal characteristics on presidential longevity rather than the interaction of personal and institutional characteristics on presidential longevity. Building a matching dataset on institutional characteristics that could be used to test this interaction would build upon this current research.

Another area for future research concerns observations regarding presidents' prestigious careers. Successful presidential leadership not only speaks about presidents' leadership ability but also about their importance to the institution over the long term. As previously mentioned, successful presidents were often highlighted on IHE websites and extolled for increasing student enrollment, facilities, and funding for research. Many were credited with "turning" the institution around (see also Langbert, 2012). Future research could delve further into this topic, using IHEs' characterizations of their presidents to test this theory.

In a similar vein, Cohen and March (1974) purport that the presidency is the swansong of a president's career, meaning that by the time presidents enter the presidency, their next step is retirement. However, during data collection, it was frequently observed that many presidents who announced retirement from the presidency had plans to return to the faculty after a short sabbatical or were later appointed president emeritus of the university. The president emeritus is a paid position with a responsibility to fundraise on the university's behalf (i.e., a presidential function), therefore (hypothetically), president emeriti are continuing in a presidential role without the day to day responsibility and stress of the top job. So, have they really retired from the presidency? Future research might parse out unique aspects of post-presidential activities to understand their influence on presidential turnover and tenure.

A final area for future research relates to the theory of personnel exchange between institutions (Birmbaum,1971) and Langbert (2012) study on social matching. Birnbaum (1971) posits that in large part, presidential turnover in higher education is

merely “the exchange of personnel between related organizations” (p.133); working your way up the company ladder if you view all of higher education as one big company or family. He found that college and university presidents succeed other presidents at institutions with similar selectivity, control (public or private) and type (e.g., two-year, four-year, masters, etc.); institutional size was not a factor (Birnbaum, 1971). Birnbaum’s theory provides support for the trends described in the recent literature (Monks, 2012; Reed, 2002) about the movement of public university presidents to multiple presidencies throughout their careers. Supporting evidence was also found during data collection and preliminary analysis. As data collection reached about 75% complete, the researcher began to experience déjà vu by the time several institutions’ and presidents’ names were reached in the list. Many of the individuals were predecessors or successors of other presidents or had previously served at the IHE. Exploring trends among public university presidents would further increase understanding of presidential tenure and longevity.

Conclusions

Publicly available data on university presidents located on IHE websites and other digital sources is a viable source for higher education research, especially studies on presidential longevity. When large amounts of categorical data are present in the dataset, large samples ($n > 500$ or 1000) are recommended for higher education research utilizing structural equation modeling. Use of presidents’ full tenure rather than the completed tenure of sitting presidents provides a better understanding of presidential tenure and turnover trends in higher education.

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APPENDIX A

RESEARCH STUDIES RELATED TO TENURE AND LONGEVITY IN HIGHER EDUCATION

Reference	Purpose (P) / Hypotheses (H) / Research Questions (RQ)	Data and Analysis
Birnbaum (1971)	H1. Institutions of higher education tend to select as presidents, individuals who have been socialized in institutions with similar characteristics.	• Higher education presidents in New York State in 1970 whose previous position was in another academic institution (n=76) • Bivariate correlational analysis
Birnbaum (1989)	RQ1. How important is the president to college and university performance? RQ2. Do presidents make a difference? If so, what is it and how do we know?	• ETS' Institutional Functioning Inventory (IFI), capturing faculty perceptions of organizational culture, during 1968-1970, and again in 1980-1981 • 91 colleges and universities completed the IFI • 3-Factor ANOVA
Howells (2011)	RQ1. What method(s) of selection, of the six put forward, were most successful in selecting presidents based on longevity? RQ2. What is the relationship between type of presidential search used and the length of tenure in the sample?	• Survey of community and junior college presidents affiliated with American Association of Community Colleges (AACC) (n=224) • Correlational analysis; General Linear Model
Jo (2008)	RQ1. What institutional factors contribute to voluntary turnover among midlevel women administrators in higher education? RQ2. How can academic organizations shape their human resource policies and practices to be more attractive as employers and reduce voluntary turnover among women?	• In-depth interviews (n=30) with women once employed by a large private research university in Northeastern U.S. • Questionnaire with 12 variables found to influence turnover in pilot study at same institution
Johnsrud & Rosser (2002)	P1. To gain a better understanding of the constructs: faculty worklife, morale, and intentions to leave P2. To examine relationships among faculty worklife, morale, and intentions to leave P3. To determine the extent to which these relationships operate within faculty groups (as individuals) or between faculty groups (as institutions)	• Survey of faculty members (n=1,511) employed in a 10-campus university system in a western state. • Multilevel Structural Equation Model (SEM)
Langbert (2012)	RQ1. To what degree does social matching, such as resulting from being an alumnus/a, having gone to school nearby, or having a closely matched religious background, influence presidential tenure? RQ2. To what degree does performance, including effectuating a turnaround, influence tenure? RQ3. If academic boards do extend presidents' tenure based on performance, what aspect of performance do they aim to maximize?	• 1999-2000 and 2005-2006 cross-sectional data on private college and university presidents (n=200) • Data analysis included T-statistics, correlational analyses, and Weibull distribution and Tobit estimation to derive a hazard-function-duration-maximum-likelihood model

McDonald (2012)	RQ1. What are the leadership skills that facilitate longevity in tenure for exemplary community college presidents? RQ2. What leadership-support structures enhance longevity in tenure for exemplary community college presidents? RQ3. What relationships do exemplary community college presidents create and maintain? RQ4. What factors and experiences are of significance in preparing exemplary community college presidents? RQ5. How are the AACC's competency domains related to longevity in tenure for exemplary community college presidents?	• 50 item web-survey instrument with open and closed-ended (3/50) Likert scaled items; • 48/100 responses used to refine interview protocol • 12 In-depth interviews (6 presidents, 2 VPs, 2 faculty, 2 board members) • Descriptive statistics, correlational analysis and hypothesis tests used in quantitative analysis
McNaughtan (2016)	RQ1. What are the organizational and demographic factors associated with declining college presidential tenure, and how have they changed over time? RQ2. Is fit (complementary or supplementary) associated with college presidential tenure? RQ3. Do the factors associated with presidential turnover differ by institutional type? RQ4. Has the relationship between organizational fit and turnover changed over time? RQ5. Has the relationship between presidential turnover and organizational fit varied over time by institutional type?	• ACE College President Survey: 2001 (n=2,131), 2006 (n=1,970) and 2011 (n=1,598) • Negative binomial regression (RQ1, RQ2, RQ3) • Event history analysis (RQ4, RQ5)
Monks (2012)	P1. What are the individual and institutional attributes related to presidential job stability (turnover)?	• ACE College President Survey (2001 and 2006), Chronicle of Higher Education online executive compensation dataset, and IPEDS data for (n=787) matched institutions that had valid presidential job durations • Logistic regression
Nora (1987)	P1. Specify a causal model that estimates the effects of grades, parents' education, encouragement, academic integration, social integration, institutional/goal commitments on college student retention.	• Survey of first-time Chicano students enrolled in 3 community colleges full-time or part-time in 1977 or 1978 (n=227) • Structural Equation Modeling (SEM)
Padilla & Ghosh (2000)	P1. To explore recent trends in college and university presidents' service.	• Survey on presidents of Research I universities (n=200) (stated in Padilla, 2004) • Survival analysis used to measure declines in tenure as well as estimate probabilities of total tenure.
Pascarella & Terenzini (1983)	P1. To provide a comprehensive test of Tinto's (1975) causal model of voluntary student withdrawal from college P2. To test interactions between social and academic integration and institutional and goal commitment	• Three data collections (survey and student records) during 1976-1977 and 1977-1978 academic school years (n=763) • Path analysis

Reed (2002)	RQ1. What was the turnover rate of presidents within six years of appointment? RQ2. Were there significant differences in tenure and turnover by gender and race? RQ3. How did tenure and turnover of these presidents compare to private institution chiefs appointed during the same period? RQ4. What was the relationship of professional characteristics (origin of candidacy, career path to the presidency, and number of prior presidencies) to presidential tenure and turnover? RQ5. What was the relationship of institutional characteristics (enrollment, institution type and wealth, and president's reporting line) to presidential tenure and turnover? RQ6. What were the post-presidency activities of those who left their positions?	• Survey of presidents (n=151) appointed to public four-year institutions between 1987 and 1990 • Linear regression, one-way ANOVA, T-tests
Röbken (2007)	H1a. University size is positively associated with presidential tenure. H1b. University size is negatively associated with presidential tenure. H2. The average tenure has declined since the 1990s. H3. The relationship between expenditure on teaching and average presidential tenure is positive. H4. The relationship between expenditure on research and average presidential tenure is positive. H5. Average tenure and pressure for reforming higher education institutions are negatively associated.	• Succession events among German university presidents and rectors between 1960 and 2004 (n=620) • ANOVA used to examine relationship between organizational size and presidential tenure (H1a, H1b) • Longitudinal analysis (H2) and correlational analysis to examine relationship between tenure and teaching expenditure, research expenditure and reform pressures (H3, H4, H5)
Smart (1990)	P1. Propose and estimate a recursive causal model of faculty turnover intentions: Individual and institutional characteristics → Contextual, work environment measures → Dimensions of faculty job satisfaction → Intention to leave current institution	• Faculty responses to the 1984 Carnegie Foundation for the Advancement of Teaching national survey (n=2,648) • Structural Equation Modeling (SEM)
Tekniepe (2014)	H1. Governing board knowledge and training decrease the incidence of a push-induced departure. H2. Contract provisions that prevent politically driven terminations decrease the incidence of a push-induced departure. H3. Good working relations between faculty associations and administration during labor negotiations decrease the incidence of a push-induced departure. H4. Good working relations between deans and administration when resolving internal disagreements decrease the incidence of a push-induced departure. H5. Increased pressures by community stakeholders increase the incidence of a push-induced departure. H6. Increased general operating costs and its impact on balancing the college's budget increase the incidence of a push-induced departure.	• Web-based survey of community college presidents who had previously served in the capacity of president across 34 states (n=101) • Logistic regression

Wofford (2014)	RQ1. Is there an association between the numbers of U.S. public universities' presidential succession events and IPEDS student enrollment between 2000 and 2010? RQ2. Is there an association between the numbers of U.S. public universities' presidential succession events and IPEDS cohort default rate between 2000 and 2010? RQ3. Is there an association between the numbers of U.S. public universities' presidential succession events and annual rankings on the Top American Research Universities (TARU) report between 2000 and 2010?	• Data sources: IPEDS, *Top American Research Universities* (TARU; The Center for Measuring University Performance) and presidential succession counts from university websites • Sample (n=147) included all public research universities (RU/VH, RU/H) • Correlational analysis